Amended AGENDA
CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC)
May 14, 2009 Meeting
Los Angeles, Caltrans District 7 Office
Starting Time 9:00 A.M.

Organization Items

1 Introduction
2 Approval of Minutes (January 15, 2009 and March 19, 2009 Meetings)
3 Membership
4 Public Comments

At this time, members of the public may comment on any item not appearing on the agenda. Matters presented under this item cannot be discussed or acted upon by the Committee at this time. For items appearing on the agenda, the public is invited to make comments at the time the item is considered by the Committee. Any person addressing the Committee will be limited to a maximum of five (5) minutes so that all interested parties have an opportunity to speak. When addressing Committee, please state your name, address, and business or organization you are representing for the record.

Agenda Items

5 Public Hearing

Prior to adopting rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to Section 21400 of the California Vehicle Code (CVC), the Department of Transportation is required to consult with local agencies and hold public hearings.

		Page #s
07-17	Proposal for C17A (CA) ROAD WORK Plaque and Amendment to CA MUTCD Section 6F.104	(Continued) (Henley) 5-5
08-8	Bicycle and Motorcycle Detection at New or Upgraded Signalized Intersections (Required due to AB 1581)	(Continued) (Henley) 6-16
09-5	Amendment to CA MUTCD Sections 2B.03 Size of Regulatory Signs and 2C.04 Size of Warning Signs (Request Submitted by Caltrans)	(Continued) (Henley) 17-18
09-6	Amendment to CA MUTCD Section 2D.45 General Service Signs (D9 Series) (Request Submitted by Caltrans)	(Continued) (Henley) 19-24

6 Request for Experimentation

09-9	Request to Experiment with Steady Red Stop Line Light (Requested by the City of Los Angeles)	(Introduction) (Fisher) 25-33
09-13	Experiment Request for the USAGE OF "HOV" IN LIEU OF "CARPOOL" Signage Related to the Los Angeles EXPRESS LANES	(Introduction) (Henley) 34-38
09-14	Experiment request for the Usage of "TRANSIT LANE" in lieu of "CARPOOL" Signage	(Introduction) (Henley) 39-41

7 Discussion Items

09-15	Non-standard Traffic Control devices on Public Roadways	(Introduction) (Henley) 42-42
09-16	Signage, Intersection Design, and the 3.0 Second Minimum Yellow for Turning Movements Monitored by Red Light Cameras	(Introduction) (Henley) 43-50
Added 09-10	Section 2B.13 Speed Limit Sign (R2-1) of CA MUTCD (Request submitted by Caltrans)	(Introduction) (Henley) 54-54

8 Information Items

09-17	California MUTCD Revision to include National MUTCD 2003 Revision No. 2 Maintaining Traffic Sign Retroreflectivity	(Introduction) (Henley) 51-51
09-18	American Recovery and Reinvestment Act Project Funding Sign Assembly	(Introduction) (Henley) 52-53

9 Recent Actions taken by Caltrans on the Committee's Recommendations

05-10 Proposal for the Watershed Boundary Signs

(Final Policy for the Watershed Sign has been posted on the CA MUTCD website at the following web link under item "09-02): http://www.dot.ca.gov/hq/traffops/signtech/signdel/policy.htm)

06-12 No Parking Signs

(Final Policy for the NO Parking Signs has been posted on the CA MUTCD website at the following web link under item "09-01): http://www.dot.ca.gov/hq/traffops/signtech/signdel/policy.htm)

10 Tabled Item

08-22	Proposal to amend CA MUTCD Section 10C.15 & 10C.23 (Item Deferred for the Future Meeting)	(Continued) (Wong)
06-7	MUTCD 2003 Revision No. 1 (Pharmacy Signing) (Proposed to Adopt Pharmacy Signing in CA)	(Continued) (Henley)
08-18	Proposal to adopt "NO IDLING COMMERCIAL VEHICLES & SCHOOL BUSES" (Item Deferred for the Future Meetings)	(Continued) (Henley)

11 Next Meeting

12 Adjourn

ITEM UNDER EXPERIMENTATION

04-9	Request to Experiment with "Watch The Road" Sign (Proposed by the Los Angles DOT)	(Bahadori)
06-2	Experiment with Colored Bike Lane (Proposed by the City of San Francisco)	(Banks)
06-5	Clear The Way Signage (Drive Damaged Vehicle to Shoulder) (Proposed by the CHP and MTC)	(Whiteford)
07-7	Experimentation by Implementation of Two New School Site Loading Signs	
07-19	Wildlife Corridor Signage (Proposed by the County of San Bernardino)	(Babico)
08-7	Request for Experimentation with new Warning Sign for Bicyclists (Proposed by the City/Co of San Francisco)	(Wong)
08-20	Request to Experimentation with Flashing Yellow Arrow for Permissive Right Turn Movement	(Mansourian)
08-21	Proposal to Experiment with Regulatory Sign "BIKES IN LANE" with Bicycle Symbol (Originally submitted as "Bike May Use Full Lane")	(Henley)

Pending Items for Caltrans Action

The following recommendations by the Committee will be incorporated during the CA MUTCD revision and will be accomplished by the end of Year 2009.

01-1 U-Turn Signal Heads Indicator

02-15 Radar Guided Dynamic Curve Warning Sign

06-9 Proposal to adopt C43 (CA) signs

07-1 Proposal to revise the sizes for the Supplemental School Plaques (S4-3, W16-7p and W16-9p)

07-5 Proposal to Amend Section 2C.29 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4)

07-12 Amendment to CA MUTCD Section 4E.08 Pedestrian Detectors

07-18 Proposal to Amend "FWY Detour With Arrow" SC9 (CA) Sign and Adopt "Exit With Arrow Sign"

07-22 Proposal to adopt "Trucks Entering Exiting" sign C44 (CA)

07-23 Bus Preferential Only Lane Signs

07-24 Installation of School Assembly C in Rural Areas with Sidewalks

08-3 Amendment to CA MUTCD Section 4D.17 Visibility, Shielding, and Positioning of Signal Faces

08-4 Bus Preferential Only Lane Signs

08-5 No Double - Parking Anytime Commercial Vehicles Signs

08-9 Proposal to amend policies for the STOP sign

08-10 Proposal to adopt "WATCH FOR STOPPED VEHICLES" sign

08-12 Report DRUNK DRIVERS – CALL 911 (G81-6X(CA)

08-13 MUTCD 2003 Revision No. 2 Maintaining Traffic Sign Retroreflectivity

08-14 Proposal to amend recommendations made by the CTCDC in regards to Section 2B.13 Speed Limit Sign (R2-1) of CA MUTCD

08-15 Proposal to amend Fire Station SG38 (CA) & SG39 (CA) signs

08-19 Proposal to adopt ACTIVATED BLANK-OUT Directional and DO NOT ENTER & WRONG WAY signs**.**

08-24 Proposal to Adopt POST OFFICE Directional SG60(CA) sign

07-17 Proposal to amend reduced speed limits policy in TTC zones and adopt WORK ZONE Plaque & END WORK ZONE SPEED LIMIT Sign

Caltrans deferred this item for the next meeting.

08-8 Bicycle and Motorcycle Detection at New or Upgraded Signalized Intersections (Formerly known as "Traffic Actuated Signals for the Bicycles and Motorcyclists")

RECOMMENDATION: The AB 1581 Subcommittee requests that the CTCDC recommends adoption of the language below into the CA MUTCD.

AGENCY REQUESTING/SPONSORING: Caltrans, at the direction of the Legislature

BACKGROUND:

AB 1581 (Fuller) was signed by the Governor on October 8, 2007, and became law on January 1, 2008. The legislation reads as follows:

Assembly Bill No. 1581

CHAPTER 337

An act to add and repeal Section 21450.5 of the Vehicle Code, relating to vehicles.

[Approved by Governor October 8, 2007. Filed with Secretary of State October 8, 2007.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1581, Fuller. Traffic-actuated signals: bicycles: motorcycles.

(1) Existing law provides for official traffic control devices.

This bill would include as an official traffic control device a traffic-actuated signal that displays one or more of its indications in response to the presence of traffic detected by mechanical, visual, electrical, or other means. Upon the first placement of a traffic-actuated signal or replacement of the loop detector of a traffic-actuated signal, the signal would have to be installed and maintained, to the extent feasible and in conformance with professional engineering practices, so as to detect lawful bicycle or motorcycle traffic on the roadway. Cities and counties would not be required to comply with those requirements until the Department of Transportation has established uniform standards, specifications, and guidelines for the detection of bicycles and motorcycles by traffic-actuated signals and related signal timing. The Commission on State Mandates would be required to consult with the Department of Transportation regarding mandate claims relating to these provisions. This bill would provide that its provisions would remain in effect until January 1, 2018, and would be repealed on that date. By imposing new duties on local government, this bill would impose a state-mandated local program upon local governments.

(2) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that, if the Commission on State Mandates determines that the bill contains costs mandated by the state, reimbursement for those costs shall be made pursuant to these statutory provisions.

The people of the State of California do enact as follows:

SECTION 1. (a) The Legislature hereby finds and declares the following:

(1) Bicyclists and motorcyclists are legitimate users of roadways in California.

(2) Traffic-actuated signals that do not detect bicycle or motorcycle traffic pose a danger to law-abiding bicyclists and motorcyclists.

(b) It is the intent of the Legislature in enacting this act to better protect law-abiding bicyclists and motorcyclists.

SEC. 2. Section 21450.5 is added to the Vehicle Code, to read:

21450.5. (a) A traffic-actuated signal is an official traffic control signal, as specified in Section 445, that displays one or more of its indications in response to the presence of traffic detected by mechanical, visual, electrical, or other means.

(b) Upon the first placement of a traffic-actuated signal or replacement of the loop detector of a traffic-

actuated signal, the traffic-actuated signal shall, to the extent feasible and in conformance with professional traffic engineering practice, be installed and maintained so as to detect lawful bicycle or motorcycle traffic on the roadway.

(c) Cities, counties, and cities and counties shall not be required to comply with the provisions contained in subdivision (b) until the Department of Transportation, in consultation with these entities, has established uniform standards, specifications, and guidelines for the detection of bicycles and motorcycles by traffic-actuated signals and related signal timing.

(d) This section shall remain in effect only until January 1, 2018, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2018, deletes or extends that date.

SEC. 3. The Commission on State Mandates shall consult with the Department of Transportation when it develops parameters and guidelines for any mandate claim arising from the enactment of these provisions to ensure that eligible reimbursement is limited solely to the incremental costs of installing sensor wiring that can detect bicycle or motorcycle traffic.

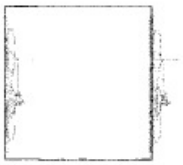
SEC. 4. If the Commission on State Mandates determines that this act contains costs mandated by the state, reimbursement to local agencies and school districts for those costs shall be made pursuant to Part 7 (commencing with Section 17500) of Division 4 of Title 2 of the Government Code.

At its January 31, 2008, meeting, the CTCDC requested that Caltrans form an AB 1581 Subcommittee to advise the CTCDC on developing uniform standards, specifications and guidelines for the detection of bicycles and motorcycles by traffic-actuated signals and related signal timing. The members of the AB1581 Subcommittee are:

Ahmad Rastegarpour, Chair	Caltrans
Kai Leung	Caltrans
Ken McGuire	Caltrans
Richard Haggstrom	Caltrans
Damon Curtis	SFMTA
David Roseman	City of Long Beach
Sean Skehan	LADOT
Robert Shanteau	Bicyclist representative
James Lombardo	Motorcyclist representative

The AB 1581 Subcommittee met on March 4, April 2, July 9 and September 25, 2008. The rest of this background addresses the Subcommittee's recommendations regarding detection of bicycles and motorcycles and related signal timing.

The AB 1581 Subcommittee found that motorcycles are difficult to detect because of their small size and that bicycles are often not detected at all because most loops are designed to detect horizontal sheets of metal, such as the bottom of a car or truck, while the rims on bicycle wheels, although typically metal, are vertical. For instance, the common Type A (square) loop can only detect a bicycle that is located over the loop conductors, as shown in this figure:



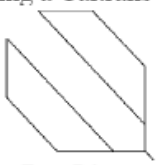
"Sweet" spots

Conductors, as shown in this figure:

But a bicycle cannot be detected over the center of a Type A loop, as shown here:

"Dead" spot

To detect a bicycle across its entire width, an inductive loop needs to be a diagonal quadrupole, examples of which are shown here, including a Caltrans Type D and a quadracircle loop:



Type D loop

Quadracircle

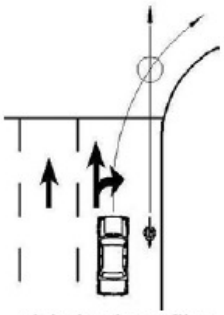
The Type D loop was invented and was introduced into the Caltrans Standard Plans in the 1980's but deployment has been limited. Winding and sawcut details are shown in Caltrans Standard Plan ES-5B.

The quadracircle was invented in about 1990 in Palo Alto. Several local agencies in California have reported success using it, although Caltrans has not experimented with it. Winding and sawcut details are shown in Cupertino's Standard Detail 5-19.

Even if the loop is not a diagonal quadrupole, a bicyclist who knows to stop on top of the conductors may still be detected. But many loops are covered by the final lift of pavement. The CA MUTCD provides for a Bicycle Detector Symbol, shown at right, that can be used to show bicyclists where to stop.

Limit line loops are normally 6' wide by at least 6' long and centered in the lane, or about 3' from the left lane line of a wide right lane. Wider loops would have a hard time rejecting vehicles in the adjacent lane and narrower loops would not be able to detect motorcycles. Motorcyclists are taught to ride in either the right or left wheel track, and since the wheel track of a typical car is about 5' wide, motorcyclists will generally stop about 2½-3' from the center of a lane. This places the motorcycle over the edge of a 6' loop, which is an ideal position for it to be detected.

A limit line loop in a wide right lane may be located some distance from the right hand curb or edge of pavement. That brings up the question of where a bicyclist would be expected to stop. CVC Section 21202(a) requires a bicyclist traveling "at a speed less than the normal speed of traffic" to ride "as close as practicable to the right-hand curb or edge of the roadway" but gives an exception when the bicyclist is "approaching a place where a right turn is authorized." This exception was intended to provide the bicyclist the flexibility to avoid having to stop against the right hand curb or edge of the road where a potential "right hook" conflict would be created with a right turning motorist. By stopping in the center of the travel lane, a bicyclist is in a position to be seen by following motorists while not creating a conflict with right turning drivers.



Right hook conflict

Where there is a bike lane on an approach, bicyclists may also need to be detected in a travel lane. CVC 21208 requires a bicyclist traveling "at a speed less than the normal speed of traffic moving in the same direction at that time shall ride within the bicycle lane" but gives the same exception as CVC 21202(a) when the bicyclist is "approaching a place where a right turn is authorized."

The AB 1581 Subcommittee recommends that all new limit line detectors shall provide an approximate

6'x6' Limit Line Detection Zone located in the center of every travel lane, or about 3' from the left lane line of a wide right lane, and that such Limit Line Detection Zones detect motorcycles and bicycles. A narrower limit line detection zone may be necessary for a bike lane. The Subcommittee also recommends that if more than half of the limit line detectors have been or are being replaced, then the entire intersection should be upgraded to provide Limit Line Detection Zones in every lane. Although the Subcommittee established this performance standard based on its members' knowledge that inductive loops can meet it, the standard can potentially be met by other detection technologies. **Therefore the AB 1581 Subcommittee recommends that the performance standard be made technology-neutral in order to accommodate current as well as future detection technologies.**

The next step was for the Subcommittee to determine the bicycle-rider combination that would need to be detected. (The Subcommittee found that if a bicycle and its rider can be detected, then so can a motorcycle and its rider, regardless of the detection technology being used.)

In selecting the reference bicycle-rider, the Subcommittee's objectives were to make sure that (1) most bicycles and riders were included and (2) its selection allowed for a wide variety of existing or future detection technologies. Therefore it selected a 90 pound 4' tall person riding a small adult bicycle with a non-ferromagnetic frame, aluminum rims, stainless steel spokes and headlight, such as the folding bicycle shown at right. The reason a 90 pound 4' tall person was selected was that a small person is the most difficult for technologies such as video detection systems to detect. The reason a folding bicycle was selected was that its small rims are the most difficult for technology such as inductive loops to detect. The reason that a non-ferromagnetic frame was selected was that a large number of modern bicycles are built with aluminum or carbon-fiber frames. And the reason that aluminum rims and stainless spokes were selected was that most modern bicycle wheels are made with those materials.

Currently, Figure 4D-111(CA) shows a bicyclist pushbutton and an R62C(CA) sign at an intersection and states that a pushbutton may be used to activate a traffic signal, in which case it should be located so it is convenient to use by bicyclists. This provision appears to be based on the expectation that bicyclists will stop near the curb or edge of pavement. There are three operational issues with using a bicyclist pushbutton, however: (1) A pushbutton does not serve bicyclists who are not required to ride as far to the right as practicable because they are riding at the normal speed of traffic, preparing for a left turn, avoiding hazards or at a location where a right turn is authorized (see CVC 21202(a)); (2) A bicyclist who stops to push the button is positioned to the right of right turning vehicles, inviting a right hook conflict as described above; and (3) If the lane is "too narrow for a vehicle and a bicycle to share safely side by side" (see CVC21202(a)(3)), then a bicyclist who pushes the button is in a position that invites in-lane passing by motorists. Furthermore, CVC 21450.5(b) refers to "the first placement of a traffic-actuated signal or replacement of the loop detector" and to "lawful bicycle or motorcycle traffic on the roadway." The intent of the law is that if it is feasible to detect bicycles and motorcycles in the roadway, then such detection shall be primary and a pushbutton, if used, shall be secondary. As described above, detection of bicycles and motorcycles in the roadway is feasible, so the Subcommittee recommends that a bicyclist pushbutton be allowed only as a supplement to the required limit line detection, and even then only in a lane that is wide enough for a bicycle and a vehicle to travel safely side by side within the lane and where vehicular right turns are either prohibited or not authorized. An example of such a location is a short bike lane to the left of a channelizing right-turn island (pork chop island).

R62C (CA)

On the other hand, a pushbutton may be helpful for bicycle detection on a shared-use path or bike path, but only if the bicyclist pushbutton is located on the right side of the path. (See Section 9A.03 for definitions of "shared-use path" and "bike path".)

Although AB 1581 addresses both motorcycle and bicycle detection, the proposed language below only

addresses bicycle detection. The reason is that a motorcycle will be detected wherever a bicycle is detected.

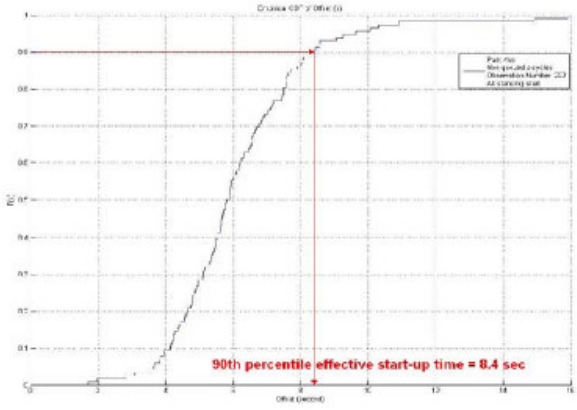
In developing its signal timing recommendation, the AB 1581 Subcommittee basically followed the pedestrian signal timing guidance in Section 4E.10 of the CA MUTCD. The Subcommittee used several sources in determining a formula for the time that will allow most bicyclists to cross an intersection of a given width.

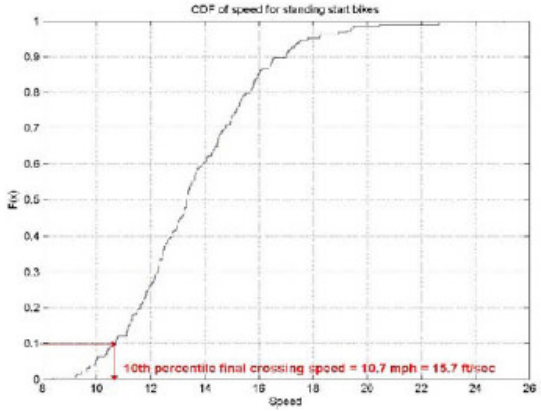
The oldest source was the 1983 edition of the *Traffic Control Devices Handbook,* which states, "The clearance time required for bicycles should be evaluated as standard practice for each signalized intersection along a heavily used bikeway. A bicyclist's speed of 10 mph (14.7 ft/sec) and a perception/reaction time of 2.5 seconds is generally used in the calculation to determine the number of seconds required to ride across a given street."

The 1995 ITE Journal article *Signal Clearance Timing for Bicycles* reports, "The speed of bicyclists ranges from less than 10 mph for schoolchildren to 25 mph for fit adults. In June 1985, the Palo Alto Transportation Division timed bicyclists at six intersections where clearance-time accidents had occurred or were considered likely to occur. The Palo Alto observations show rolling-start speeds ranging from 12 mph to 17 mph (except on Bryant crossing Oregon, where the cyclists for the most part are elementary school students). The difference in average crossing times on new green and old green at the six intersections is (in seconds) 4.8, 6.1, 5.3, 3.7, 4.8 and 4.6. This difference represents the time lost in reacting to the green light and then accelerating to full speed. In general, to avoid clearance-time conflicts on a new green, yellow and red clearance must equal or exceed the crossing time from a standing start: $g + y + r_{clear} \geq t_{cross}$."

The current *San Francisco Bicycle Plan* states, "Where possible, the City should consider timing the signals along bike routes for bicycle speeds approximately 12 to 15 mph. Minimum green times at actuated signals should take bicyclists into account. Bicyclists need more start-up time than motor vehicles. Actuated signals should be timed so that the minimum green time is at least 8 seconds where grades are flat. On routes with an upgrade, bicyclists need even more time."

An ongoing research project is being performed for Caltrans by PATH at UC Berkeley. The Committee has received reports on this study at previous meetings. The key preliminary results of this study are contained in the graphs below, which show cumulative distribution functions of the effective start-up (offset) time and final crossing speed, respectively, for bicyclists crossing El Camino Real at Park Boulevard in Palo Alto. Note that the 90th percentile effective start-up time observed at Park Boulevard was 8.4 sec while the 10th percentile final crossing speed was 10.7 mph or 15.7 ft/sec. The PATH research team notes that their start-up time comprises both the bicyclist's perception/reaction time (PRT) and the additional time that the bicyclist needs to accelerate from a standing start to final crosusing





speed, which is why it is significantly longer than traditional estimates of PRT such as the one in the *1983 Traffic Control Devices Handbook*.

The Subcommittee recommends that the CA MUTCD provide guidance that the length of the minimum green plus the yellow interval plus the all-red interval should be at least long enough to allow a design bicyclist to cross the intersection from a standing start before a conflicting green is shown. This crossing time is the time necessary to cross the intersection from a rolling start plus the additional time needed for a standing start.

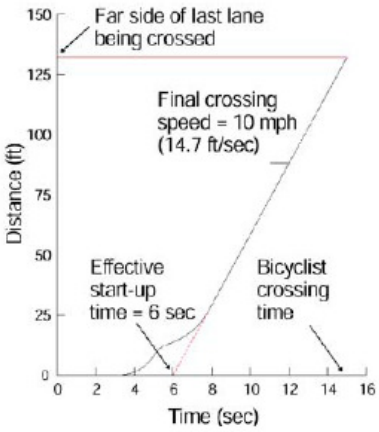
Based on the above research, the rolling start speeds range from 10 to 12 mph and the additional time needed for a standing start ranges from 3.7 to 8.4 sec. The Subcommittee recommends that the final crossing speed for the design bicyclist be 10 mph (14.7 ft/sec) and the effective start-up time needed for a standing start be 6 sec. This effective start-up time represents the time lost in reacting to the green light and then accelerating to full speed.

Thus the recommended formula for the bicyclist crossing time is

Crossing time (sec) = 6 sec + (w+6 ft)/14.7 ft/sec

where w = distance (in feet) that the bicyclist must travel to cross the intersection and a typical bicycle is about 6 ft long.

For El Camino Real at Park Boulevard, for instance, w = 125 ft, so the crossing time is 15 sec, as illustrated in the figure at right. The current minimum green, yellow and all-red intervals are 7, 3 and 1 sec, respectively. Thus the new minimum green time would need to be increased by 4 sec. It should be noted that El Camino Real at Park Boulevard has a pronounced crown, accounting for the extra time needed for bicyclists to get started there.



Using this formula results in longer minimum green times than are commonly used now, but the PATH research team found that the increased minimum green times would have a minimal effect on traffic congestion because during periods of congestion the side street green times are usually longer than the minimum green times anyway. Also, the time needed to serve pedestrian calls has a much bigger impact on congestion.

As with the pedestrian crossing time guidance already contained in the CA MUTCD, the recommendation of the AB 1581 Subcommittee is for the bicyclist crossing time to be a guidance statement and not a standard.

PROPOSAL:

Following are the AB 1581 Subcommittee's proposed changes to the CA MUTCD:

Section 4A.02 Definitions Relating to Highway Traffic Signals
15. Detector – a device used for determining the presence or passage of vehicles (including motorcycles), bicycles or pedestrians.
50A. Reference Bicycle-Rider – a minimum 4' tall person, weighing minimum 90 lb, riding on an unmodified minimum 16" wheel bicycle with non-ferromagnetic frame, aluminum rims, stainless steel spokes, and head light.
29A. Limit Line Detection Zone – an approximate 6'x6' area immediately behind the limit line, either centered in a normal width lane or approximately 3' from the left lane line if a right lane is more than 12' wide.

~~Section 4D.105(CA) Bicycle Detectors~~

~~Option:~~

~~Bicycle detectors may be required at traffic-actuated signal installations.~~

~~The loop detector logo shown on Department of Transportation's Standard Plan A24C may be used to show a bicyclist where to stop in a bike lane or traffic lane to be detected.~~

~~Support:~~

~~See Figure 4D-111(CA) for suggested locations of bicycle detectors and Department of Transportation's Standard Plans for typical bike lane pavement markings.~~

~~Efforts need to be made to ensure that signal detection devices are capable of detecting a bicycle. Detectors for traffic-actuated signals need to be located in the bicyclist's expected path, including left-turn lanes and shoulders. Marking the road surface to indicate the optimum location for bicycle detection is helpful to the bicyclist. Video detection is an effective alternate technique to loop detection.~~

Section 4D.105(CA) Bicycle/Motorcycle Detection

Standard:

All new limit line detector installations and modifications to the existing limit line detection on a public or private road or driveway intersecting a public road (see Section 1A.13 for definitions) shall either provide a Limit Line Detection Zone in which the Reference Bicycle-Rider is detected or be placed on permanent recall or fixed time operation. Refer to CVC 21450.5.

All new and modified bike path approaches to a signalized intersection shall be equipped with either a Limit Line Detection Zone or a bicyclist pushbutton, or else the phase serving the bike path shall be placed on permanent recall or fixed time operation. A bicyclist pushbutton, if used, shall be located on the right side of the bike path and where it can be reached from the bike path. See Section 9B-10 for bicycle regulatory signs.

At new signalized intersections or when the advance detection is being replaced at existing signalized intersections, phases with advance detection only shall be placed on permanent recall.

Support:

The requirement to detect the Reference Bicycle-Rider in the Limit Line Detection Zone is technology-neutral.

Option:

The detection zone in a bike lane may be narrower than 6'. See Figure 4D-111(CA).

A Bicycle Detector Symbol may be used. See Sections 9B-12 and 9C.05.

A bicyclist pushbutton may be used to supplement the required limit line detection only where all of the following conditions exist:

A. Some bicyclists might stop next to the curb or edge of pavement;
B. The lane is wide enough for a bicycle and a vehicle to travel safely side by side within the lane; and
C. Vehicular right turns are either prohibited or not authorized.

See Section 9B.10 for bicycle regulatory signs.

Guidance:

If more than 50% of the limit line detectors have been or need to be replaced at a signalized intersection, then the entire intersection should be upgraded so that every lane has a Limit Line Detection Zone.

The Reference Bicycle-Rider or the equivalent should be used to confirm bicycle detection under the following situations:

A. A new detection system has been installed;
B. The detection configuration has been modified; or
C. A complaint has been made about lack of detection by bicyclists/motorcyclists.

Support:

CVC Section 21202(a) requires bicyclists traveling "at a speed less than the normal speed of traffic" to ride "as close as practicable to the right-hand curb or edge of the roadway" with exceptions, including when the bicyclist is "approaching a place where a right turn is authorized." This exception was intended to provide the bicyclist the flexibility to avoid having to ride against the right hand curb or edge of the road where a potential conflict would be created with a right turning motorist. Accordingly, the Limit Line Detection Zone need not extend all the way to the curb or edge of pavement. See Figure 4D-111(CA).

A bicyclist pushbutton is only allowed as a supplement to the required limit line detection and then only in limited circumstances because:

A. A bicyclist pushbutton does not benefit those bicyclists who are not required to ride as far to the right as practicable because they are riding at the normal speed of traffic, preparing for left turn, avoiding hazards or at a location where a right turn is authorized. Refer to CVC 21202(a);
B. A bicyclist who stops to push the button is positioned against the right hand curb or edge of roadway where a potential conflict would be created with a right turning motorist; and
C. If the lane is too narrow for a vehicle and a bicycle to share safely side by side, then a bicyclist who pushes the button is in a position that invites unsafe in-lane passing by motorists.

A Limit Line Detection Zone provides for the detection of both bicycles and vehicles, including motorcycles.

Guidance:

Signal timing: For all phases, the sum of the minimum green, plus the yellow change interval, plus any red clearance interval should be sufficient to allow a bicyclist riding a bicycle 6' long to clear the last conflicting lane at a speed of 14.7 ft/sec plus an additional effective start-up time of 6 seconds, according the formula $G_{min} + Y + R_{clear} > 6 \text{ sec} + (w+6 \text{ ft})/14.7 \text{ ft/sec}$.

Support:

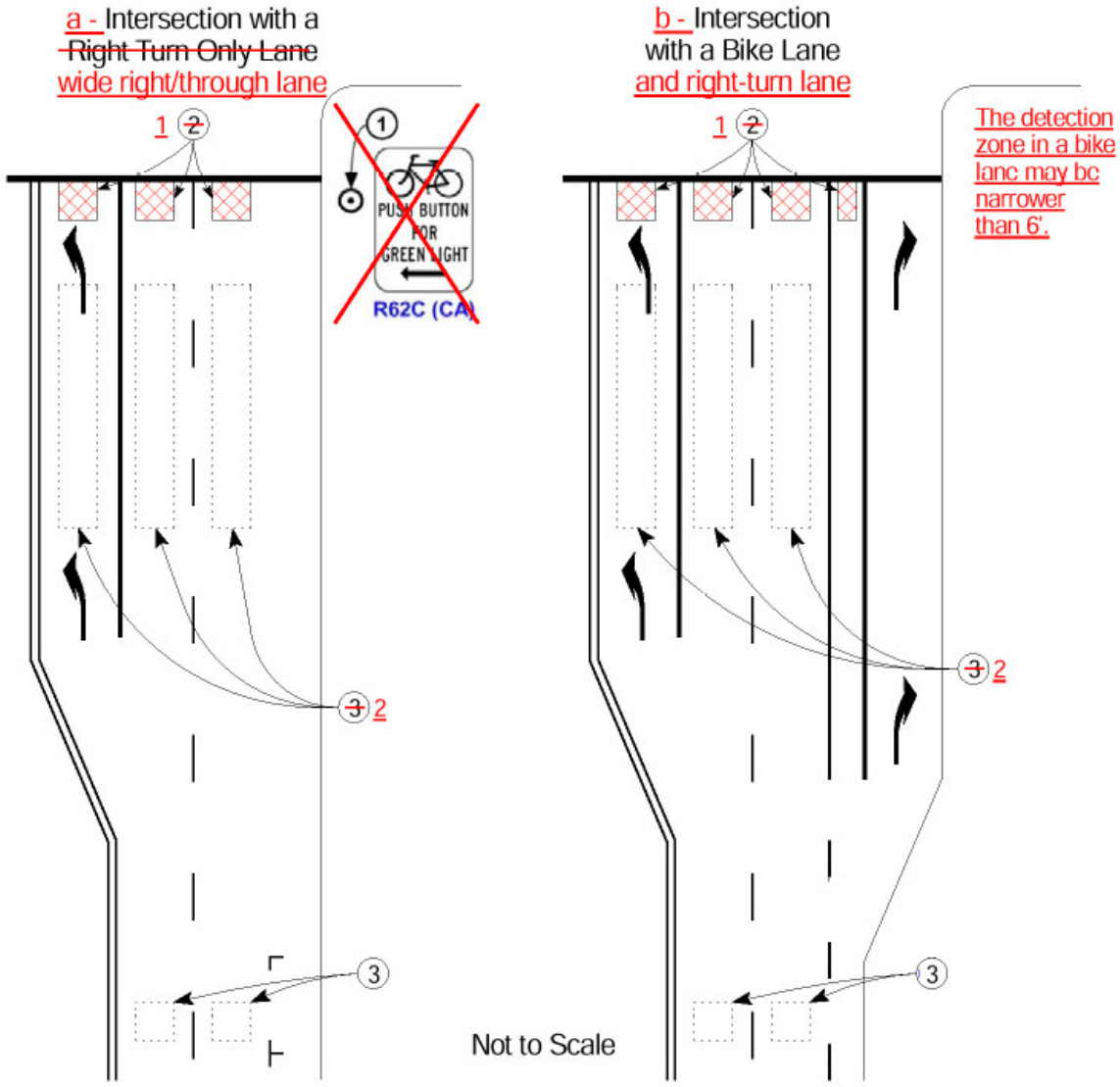
The speed of 14.7 ft/sec represents the final crossing speed and the effective start-up time of 6 seconds represents the time lost in reacting to the green light and then accelerating to full speed.

Option:

A limit line detection system that can discriminate between bicyclists and vehicles may be used to extend the length of the minimum green.

Revise Figure 4D-111(CA) as shown on the following pages.

Examples of
Figure 4D-111(CA) ~~Bicycle~~ Detection Systems
(Sheet 1 of 3)



~~1. Bike/Push Button for Green Light (R62C (CA)) Sign or a Type D Loop Detector may be used to activate a traffic signal. A push button should be located so it is convenient to use by bicyclists.~~

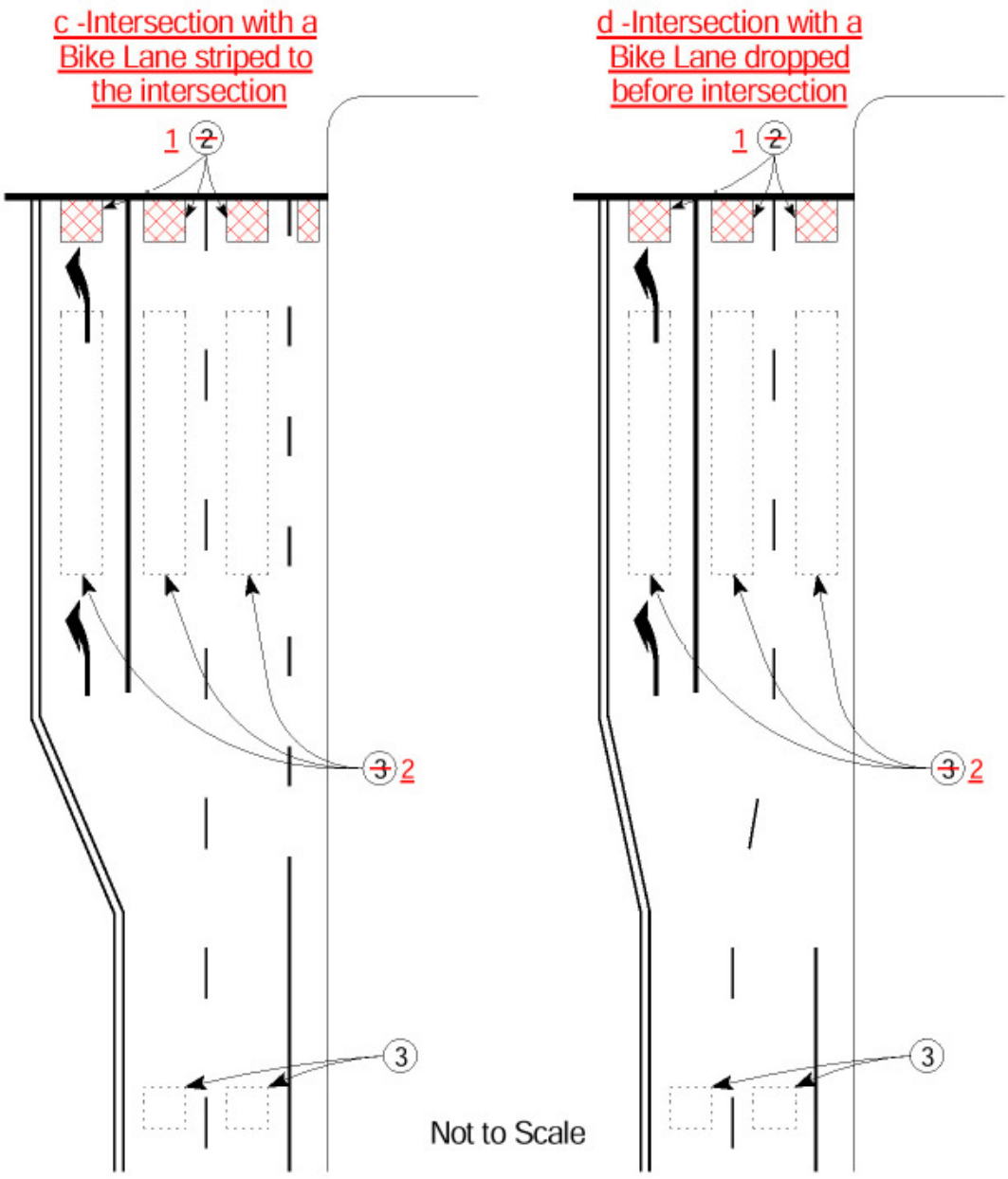
1 ~~2~~. Typical ~~Type D Loop Detector Locations.~~ technology-neutral limit line detection locations. See Section 4D.105(CA).

2 ~~3~~. Typical ~~Loop Detector locations. See Section 4D.105 (CA).~~ presence detection locations See Section 4D.103(CA).

~~4. See Standard Plan A24C for Bicycle Loop Detector pavement marking details.~~

3. Typical advance detection locations.

Examples of
Figure 4D-111(CA) ~~Bicycle~~ Detection Systems
(Sheet 2 of 3)



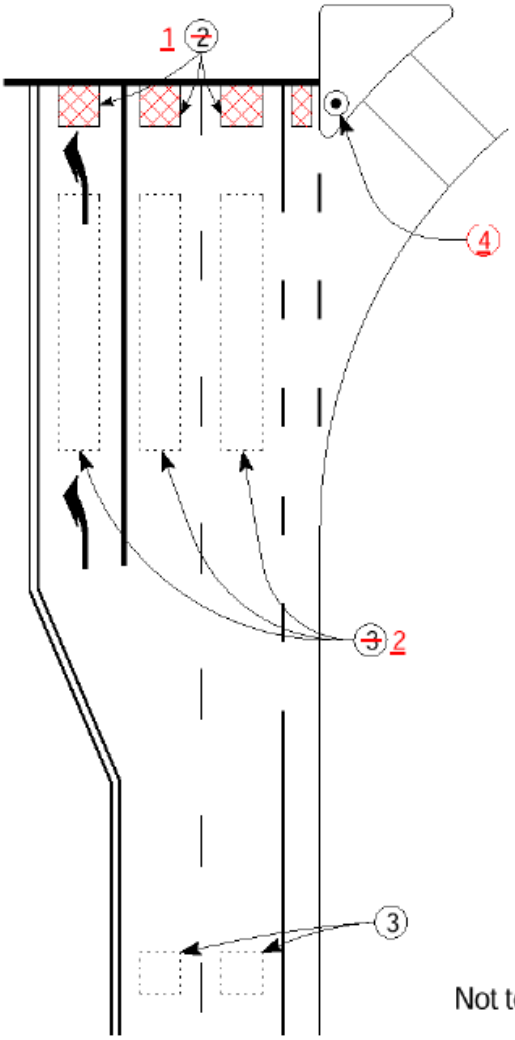
1 Typical technology-neutral limit line detection locations. See Section 4D.105(CA).

2 Typical presence detection locations. See Section 4D.103(CA).

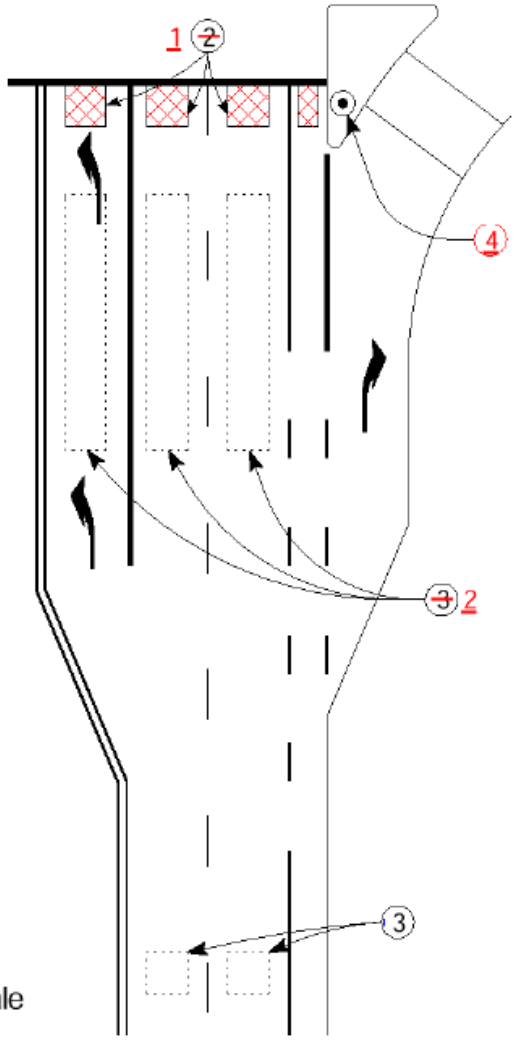
3. Typical advance detection locations.

Examples of
Figure 4D-111(CA) ~~Bicycle~~ Detection Systems
(Sheet 3 of 3)

e -Intersection with a bike lane, a shared right/through lane and channelizing island



f - Intersection with a channelized right-turn lane



Not to Scale

1 Typical technology-neutral limit line detection locations. See Section 4D.105(CA).

2 Typical presence detection locations. See Section 4D.103(CA).

3. Typical advance detection locations.

4. Typical bicyclist pushbutton locations. A bicyclist pushbutton may be used to supplement the required limit line detection where (1) some bicyclists might stop next to the curb or edge of pavement, (2) the lane is wide enough for a bicycle and a vehicle to travel safely side by side within the lane, and (3) vehicular right turns are either prohibited or not authorized. See Section 9B.10 for bicycle regulatory signs.

09-5 Amendment to Sections 2B.03 Size of Regulatory Signs and 2C.04 Size of Warning Signs

RECOMMENDATION: Caltrans requests that the Committee recommend retaining the National MUTCD requirement ("shall") for Sections 2B.03 and 2C.04 instead of the current California MUTCD amendment which makes it a recommendation ("should").

AGENCY MAKING REQUEST/SPONSOR: Caltrans

BACKGROUND:
During the last CTCDC meeting, the Committee recommended Caltrans to bring back the item to the Committee for the next meeting to ensure that any discrepancies with signs have been addressed. Particularly, the pending item 07-1 (School Sign Assemblies) must be addressed before the adoption of the proposed policy. Caltrans is modifying Table 7B-1, Size of School Area Signs and Plaques to address the discrepancies and will update the Committee during the meeting,

In the FHWA CA Division Office Review of the CA MUTCD, Matthew Schmitz noted that "Section 2B.03 Size of Regulatory Signs" in Chap 2B; and, "Section 2C.04 Size of Warning Signs" that had been changed from Standard to Guidance. In both cases, the reason for the amendment to the federal MUTCD language was given as: "The FHWA's Standard Highway Signs (SHS) book is inadequate in its current form and does not provide all the sizes that are either included in Table 2B-1, for Regulatory Signs [or Table 2C-2 for Warning Signs] or are necessary on the various classifications of roadways." This topic was discussed in a telephone conference on December 3, 2008 with Wayne Henley, Devinder Singh, and Don Howe of Caltrans; Matthew Schmitz of FHWA CA Division Office, and Kevin Sylvester of the FHWA MUTCD Team in Washington, DC who has lead responsibility for guide signs and the SHS Book. Participants agreed that the lag between policy in the MUTCD and the follow-up updates to SHS sometimes may create the situation where the two books may not synchronize, exactly; but, this still does not warrant California downgrading MUTCD Standards to Guidance statements when the issue is possible conflicts between two federal documents. Participants in the teleconference agreed that the CA MUTCD could easily be amended to reflect that Sections 2B.03 and 2C.04 that show "Guidance" language edits can be deleted to re-establish standard statements without any adverse impacts to California sign policy(-ies). The SHS was last updated in 2002; and, with the recent Notice for Proposed Amendment to the MUTCD, and pending update of the MUTCD in 2009, there will be a number of updates required to the SHS to synchronize the two federal documents.. To ensure that the CA MUTCD is in compliance with the National MUTCD the requirement (shall) be retained instead of (should) in both sections.

PROPOSAL:

Current policy in the CA MUTCD:

Section 2B.03 Size of Regulatory Signs

Standard:
The sizes for regulatory signs ~~shall~~ should be as shown in Table 2B-1.

Proposed Policy:

Section 2B.03 Size of Regulatory Signs

Standard:
The sizes for regulatory signs shall ~~should~~ be as shown in Table 2B-1.

Current policy in the CA MUTCD:

Section 2C.04 Size of Warning Signs

Standard:

The sizes for warning signs ~~shall~~ should be as shown in Table 2C-2.

Proposed Policy:

Section 2C.04 Size of Warning Signs

Standard:

The sizes for warning signs shall ~~should~~ be as shown in Table 2C-2.

ATTACHMENT: (The following are the complete text for both Sections of the CA MUTCD):

Section 2B.03 Size of Regulatory Signs

Standard:

The sizes for regulatory signs ~~shall~~ should be as shown in Table 2B-1.

Guidance:

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the regulation or where physical conditions preclude the use of the other sizes.

The Oversized size may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Signs larger than those shown in Table 2B-1 may be used (see Section 2A.12).

Section 2C.04 Size of Warning Signs

Standard:

The sizes for warning signs ~~shall~~ should be as shown in Table 2C-2.

Guidance:

The Conventional Road size should be used on conventional roads.

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the warning or where physical conditions preclude the use of the other sizes.

Oversized signs and larger sizes may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Standard:

The minimum size for supplemental warning plaques shall be as shown in Table 2C-3.

Option:

Signs larger than those shown in Tables 2C-2 and 2C-3 may be used (see Section 2A.12).

09-6 Amendment to CA MUTCD Section 2D.45 General Service Signs (D9 Series)

RECOMMENDATION: Caltrans requests that the Committee recommend for the adoption of the amendment to Section 2D.45 as proposed.

AGENCY MAKING REQUEST/SPONSOR: Caltrans

BACKGROUND: Clarification is needed on Caltrans role in approving STAA access on a State ramp or intersection leading to a local STAA route. The question is, before Caltrans approves STAA access on a State ramp or intersection leading to a local STAA route (also called a "Terminal Access" route), does Caltrans also evaluate and approve the local STAA access routes? Or is the local government solely responsible for determining STAA access on their local roads? The practice has always been that the local government is responsible for roads under their jurisdiction. Caltrans does not have the resources to evaluate each proposed local STAA route. However, Caltrans may be liable for knowingly approving a STAA access ramp when the local STAA route does not meet the criteria for the STAA vehicles.

A Caltrans district recently evaluated a county intersection after the county engineers had already approved the intersection. Caltrans disagreed with the county's evaluation and refused to approve the State ramp. The county threatened litigation. The situation consumed a great deal of staff time and effort for both Caltrans and the county. Caltrans Legal staff agreed that the present wording in the CA MUTCD is ambiguous.

The proposed wording will clarify the role of each agency, and should help avoid future conflicts between Caltrans and local governments over STAA route jurisdictional issues.

PRPOSAL:

STAA Truck Terminal Access (G66-56(CA)) Sign (Page 2D-31 of CA MUTCD)

…

STAA Truck Terminal Access (G66-56(CA)) signs shall be provided as follows:

1. …

2. On Local Highways:

- Signing of egress from a State Terminal Access route to a local Terminal Access route shall be done only if requested in writing by the local jurisdiction, the local jurisdiction has informed the Department in writing that the local roads and intersections on the proposed local Terminal Access route meet all geometric criteria* for STAA trucks, and ~~the entire segment including~~ the State highway ramp or intersection meets all geometric criteria for STAA trucks.

…

Local agencies should furnish Terminal Access route information to the Office of Truck Services for web publication. ~~An~~ Some examples ~~is~~ are available on the ~~Internet at the~~ following ~~web site~~ website: ~~http://www.dot.ca.gov/hq/traffops/trucks/trucksize/truckmap/county-sac.pdf.~~ http://www.dot.ca.gov/hq/traffops/trucks/truckmap/local-truck-routes.htm.

* The geometric criteria involves using a STAA vehicle to design the intersection or ramp so that the STAA vehicle can stay in its lane without encroaching into the adjacent or opposing lane.

Attachment: The following text and diagrams are from the Highway design Manual regarding STAA.

Topic 404 - Design Vehicles

404.1 General

Any vehicle, whether car, bus, truck, or recreational vehicle, while turning a curve, covers a wider path than the width of the vehicle. The outer front tire can generally follow a circular curve, but the inner rear tire will swing in toward the center of the curve.

Some terminology is vital to understanding the engineering concepts related to design vehicles. *Tracking width* is the total width needed by the tires to traverse a curve; it is the distance measured along the curve radius from the outer front tire track to the inner rear tire track as the vehicle traverses around a curve. This width is used to determine the edge of pavement.

Offtracking is the difference between the paths of the front and rear wheels of a vehicle as it negotiates a turn.

Swept width is the total width needed by the vehicle body to traverse a curve; it is the distance measured along the curve radius from the outer front corner of the body path to the inner rear corner of the body as the vehicle traverses around a curve. This width is used to determine clearance.

404.3 Design Vehicles and Related Definitions

(1) The Surface Transportation Assistance Act of 1982 (STAA).

(a) STAA Routes. STAA allows certain longer trucks called STAA Trucks to operate on the National Network. After STAA was enacted, the Department evaluated State routes for STAA truck access and created Terminal Access and Service Access routes which, together with the National Network, are called the STAA Network. Terminal Access routes allow STAA access to terminals and facilities. Service Access routes allow STAA trucks 1.6 km access off the National Network, but only at identified exits and only for designated services. Service Access routes are primarily local roads. A "Truck Network Map," indicating the National Network routes and the Terminal Access routes is posted on the Office of Truck Services website and is also available in printed form.

(b) STAA Design Vehicle. The STAA vehicle is a truck tractor-semitrailer with the following dimensions: the maximum length of the semitrailer is 14.63 m; the kingpin-to-rear-axle (KPRA) distance is unlimited by law, although the semitrailer length usually limits this distance to about 13.11 m; the maximum body and axle width is 2.59 m; the tractor length and overall length are unlimited, (Note: a truck tractor is a non-load-carrying vehicle). The STAA Design Vehicle is shown in Figures 404.5A and B.
The STAA Design Vehicle in Figures 404.5A or B should be used in the design of all projects on the National Network and on Terminal Access routes. In some cases, factors such as cost, right of way, environmental issues, local agency desires and the type of community being served may limit the use of the STAA design vehicle template. In those cases, other appropriate templates should be used. This STAA design vehicle was used to designate the existing Terminal Access and Service Access routes. The truck tractor on this vehicle has a 6.10 m wheelbase that was common in the 1980's.

(c) STAA Vehicle – Long Tractor. Since the 1980's, many truck tractors have longer wheelbases, a few reaching 7.62 m and even up to 9.14 m. The STAA Vehicle – Long Tractor in Figure 404.5C illustrates a truck tractor with a wheelbase of 7.62 m. In recent years, the highway system has experienced an increase

in the number of STAA – Long Tractor vehicles. This longer STAA vehicle combination requires a wider swept width and a longer minimum radius than the current standard STAA design vehicle.

(d) STAA Vehicle – 16.15 Meter Trailer. Another category of vehicle allowed only on STAA routes has a maximum 16.15 m trailer, a maximum 12.19 m KPRA for two or more axles, a maximum 11.58 m KPRA for a single axle, and unlimited overall length. This vehicle is not to be used as the design vehicle as it is not the worst case for offtracking due to its shorter KPRA. The STAA Design Vehicle should be used instead.

Note that both the STAA Design Vehicle and the California Legal Design Vehicle have a template with 15.24 m (minimum) and 18.29 m (longer) radii. The STAA – Long Tractor has a template with an 18.29 m radius, which is the minimum radius for this vehicle.

The longer radius templates are more conservative and are preferred. The longer radius templates develop less swept width and leave a margin of error for the truck driver. The longer radius templates should be used for conditions where the vehicle may not be required to stop before entering the intersection.

The minimum radius template can be used if the longer radius template does not clear all obstacles. The minimum radius templates demonstrate the tightest turn that the vehicles can navigate, assuming a speed of less than 16 km/h.

404.5 Turning Templates & Vehicle Diagrams

Figures 404.5A through H are computer-generated turning templates at an approximate scale of 1:500 and their associated vehicle diagrams for the design vehicles described in Index 404.3. The radius of the template is measured to the outside front wheel path at the beginning of the curve. Figures 404.5A through H contain the terms defined as follows:

(1) Tractor Width – Width of tractor body.

(2) Trailer Width – Width of trailer body.

(3) Tractor Track – Tractor axle width, measured from outside face of tires.

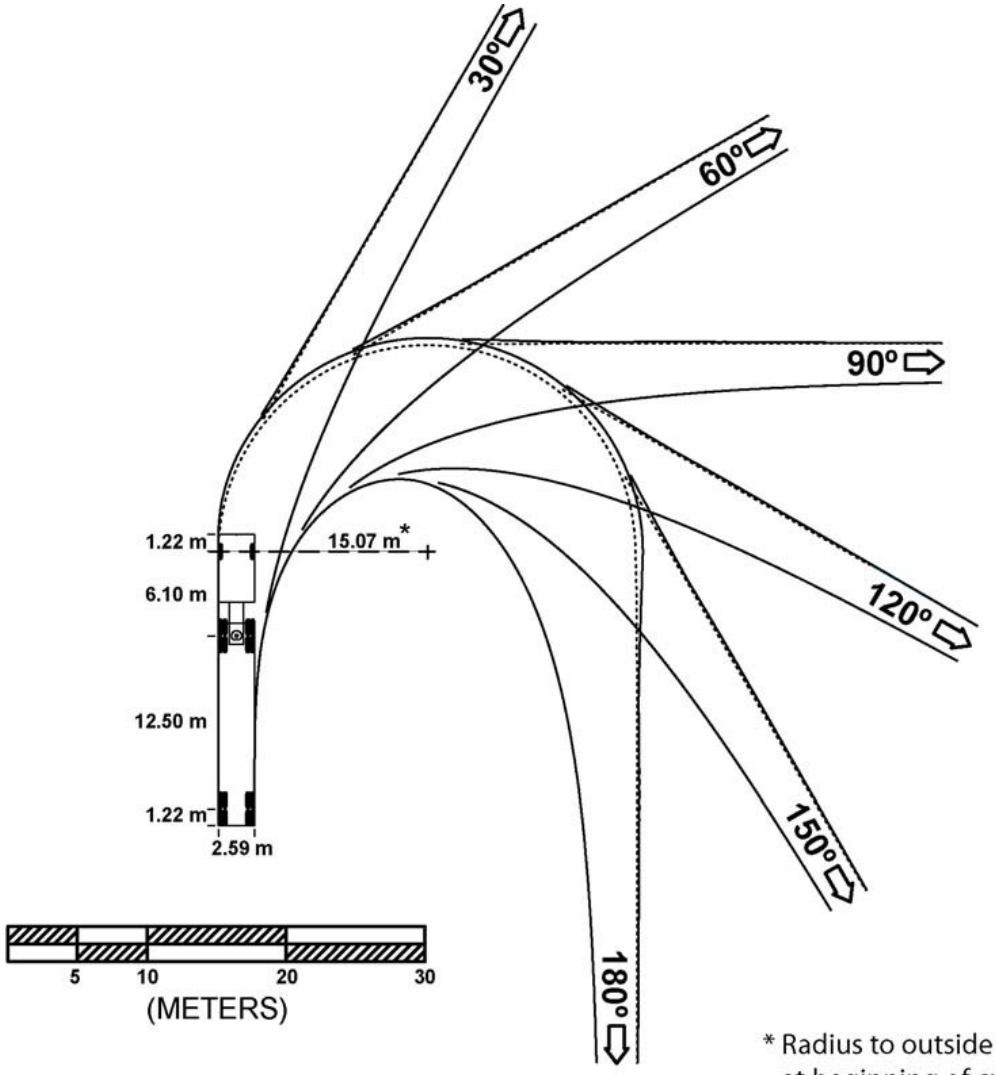
(4) Trailer Track – Trailer axle width, measured from outside face of tires.

(5) Lock To Lock Time - The time in seconds that an average driver would take under normal driving conditions to turn the steering wheel of a vehicle from the lock position on one side to the lock position on the other side. The *AutoTurn* default is 6 seconds.

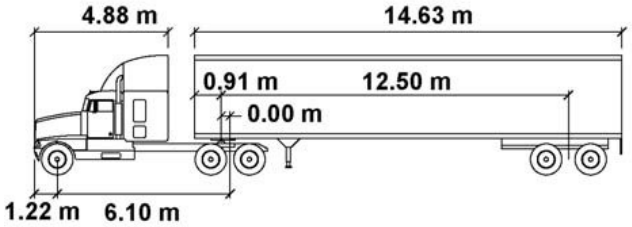
(6) Steering Lock Angle - The maximum angle that the steering wheels can be turned. It is further defined as the average of the maximum angles made by the left and right steering wheels with the longitudinal axis of the vehicle.

(7) Articulating Angle - The maximum angle between the tractor and semitrailer.

Figure 404.5A
STAA Design Vehicle
15 Meter Radius



* Radius to outside wheel at beginning of curve.



LEGEND

Swept Width (Body)

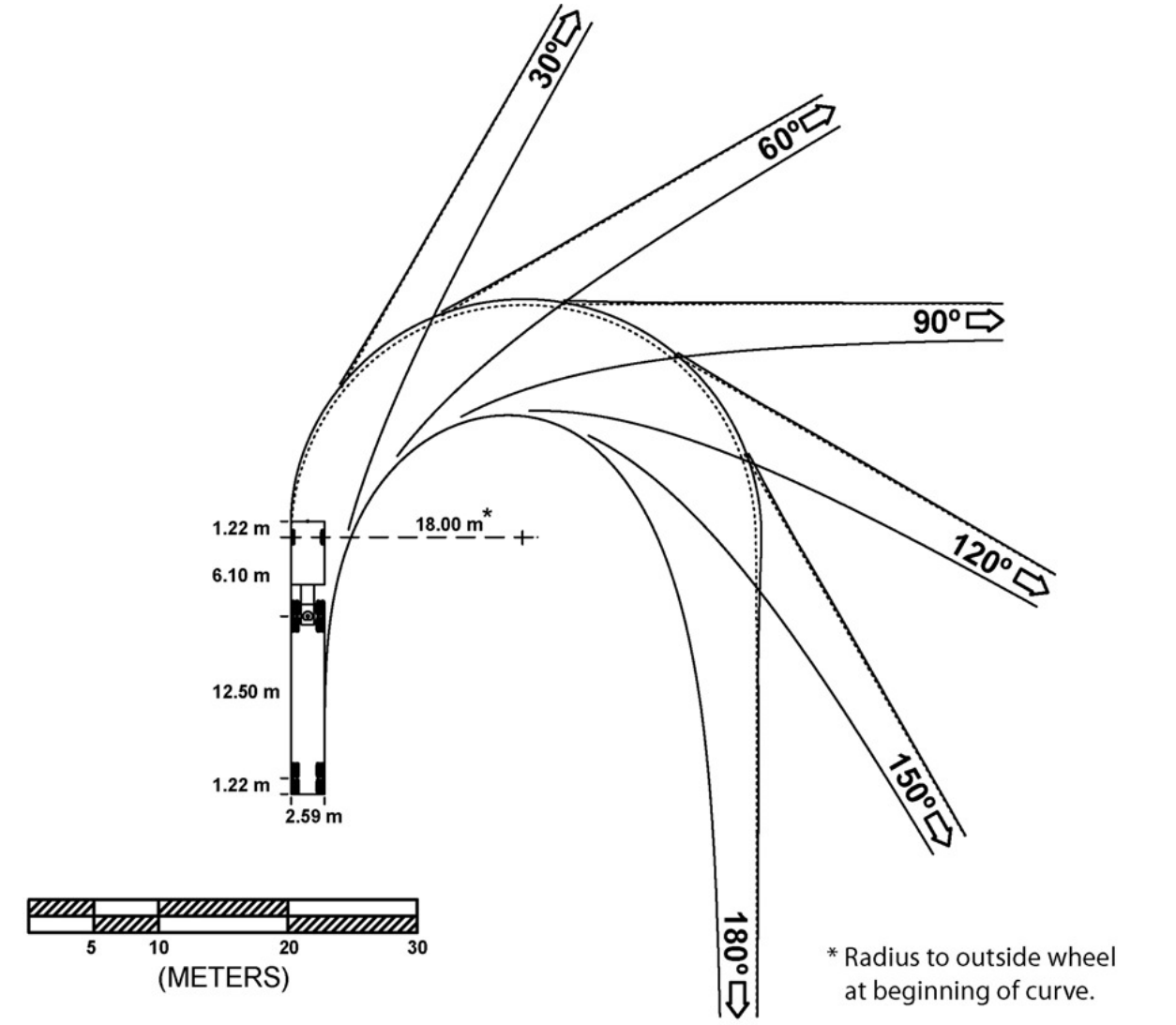
Tracking Width (Tires)

STAA - STANDARD

Tractor Width	: 2.59 m	Lock to Lock Time	: 6 seconds
Trailer Width	: 2.59 m	Steering Lock Angle	: 26.3 degrees
Tractor Track	: 2.59 m	Articulating Angle	: 70 degrees
Trailer Track	: 2.59 m		

Note: For definitions, see Indexes 404.1 and 404.5.

Figure 404.5B
STAA Design Vehicle
18 Meter Radius



LEGEND

Swept Width (Body)

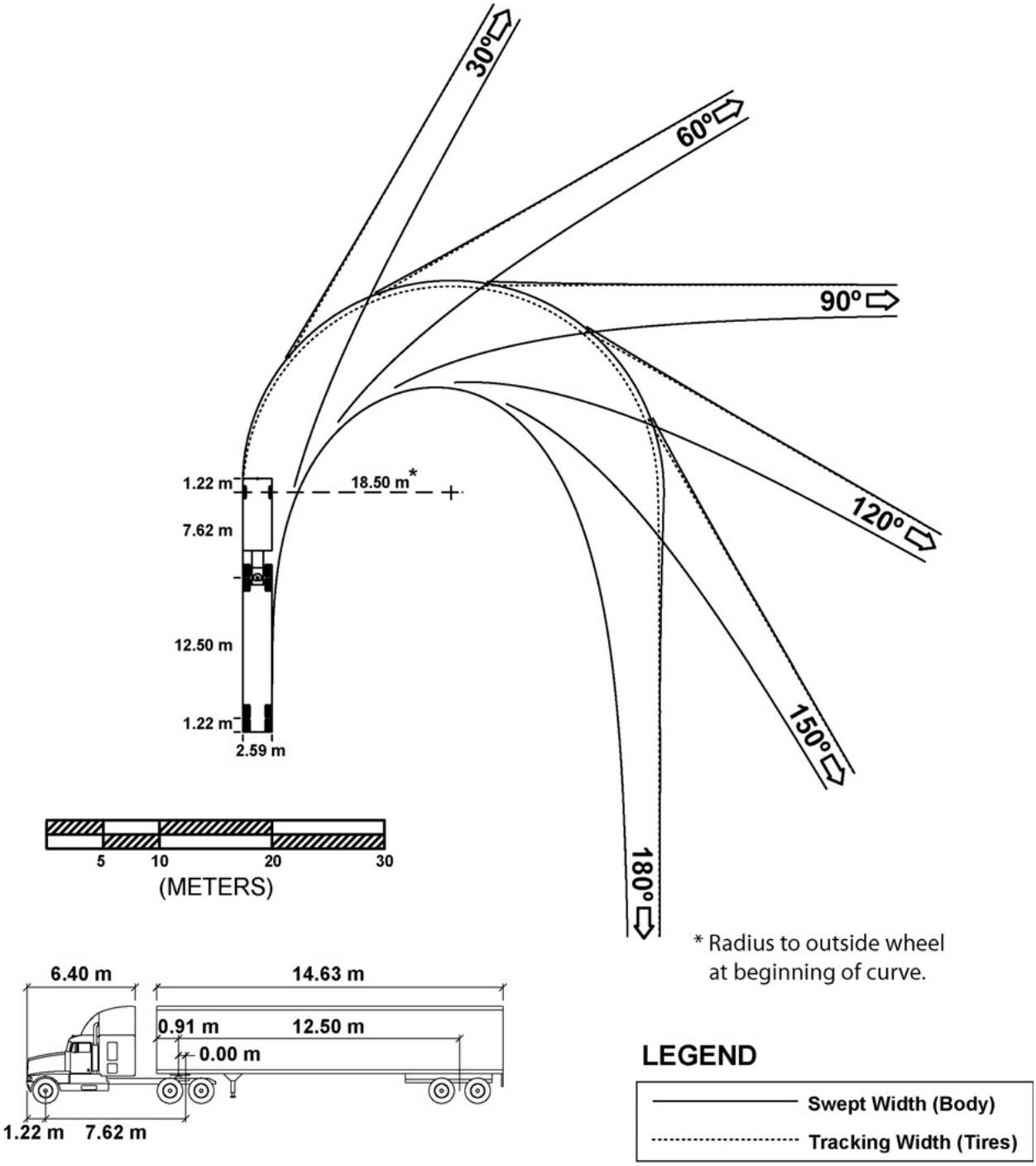
Tracking Width (Tires)

STAA - STANDARD

Tractor Width	: 2.59 m	Lock to Lock Time	: 6 seconds
Trailer Width	: 2.59 m	Steering Lock Angle	: 26.3 degrees
Tractor Track	: 2.59 m	Articulating Angle	: 70 degrees
Trailer Track	: 2.59 m		

Note: For definitions, see Indexes 404.1 and 404.5.

Figure 404.5C
STAA – Long Tractor



STAA -- LONG TRACTOR

Tractor Width	: 2.59 m	Lock to Lock Time	: 6 seconds
Trailer Width	: 2.59 m	Steering Lock Angle	: 26.3 degrees
Tractor Track	: 2.59 m	Articulating Angle	: 70 degrees
Trailer Track	: 2.59 m		

Note: For definitions, see Indexes 404.1 and 404.5.

6 Request for Experimentation:

09-10 Request to Experiment with Steady Red Stop Line Light

CITY OF LOS ANGELES
CALIFORNIA

RITA ROBINSON
GENERAL MANAGER

ANTONIO R. VILLARAIGOSA
MAYOR

DEPARTMENT OF TRANSPORTATION
100 S. Main St., 10th Floor
LOS ANGELES, CA 90012
(213) 972-8470
FAX (213) 972-8410

September 4, 2008

Mr. Devinder Singh, Secretary
California Traffic Control Devices Committee (CTCDC)
Caltrans Division of Traffic Operations – M236
1120 N. Street
Sacramento, CA 94274-0001

Request to Experiment with Steady Red Stop Line Lights

Recommendation
That the CTCDC approve the request for experimentation by the City of Los Angeles Department of Transportation (LADOT), dated September 3, 2008, as attached, to install steady red stop line lights at five intersections along the Metro Orange Line and Blue Line.

Sponsored Name
League of California Cities (Southern)

Public Agency Making Request
LADOT

Executive Summary
The FHWA granted a conditioned approval (HOTO-1-4-341 (E)) to experiment with the steady red stop line lights in May 2008. LADOT and the Los Angeles Country Metropolitan Transportation Authority (Metro) have both agreed to comply with the conditions set forth by the FHWA. Such in-pavement lights will illuminate with steady red color only when the comparable phases are red. All other times, the in-pavement lights will remain dark. This is a safety enhancement to reduce red light violations and I recommend approval to proceed with the experiment.

Sincerely,

John E. Fisher

John E. Fisher, P.E.
Assistant General Manager

Attachment
cc: Sean Skehan, LADOT
Kang Hu, LADOT

CITY OF LOS ANGELES
CALIFORNIA

RITA ROBINSON
GENERAL MANAGER

ANTONIO R. VILLARAIGOSA
MAYOR

DEPARTMENT OF TRANSPORTATION
100 S. Main St., 10th Floor
LOS ANGELES, CA 90012
(213) 972-8470
FAX (213) 972-8410

September 3, 2008

Mr. John Fisher
California Traffic Control Devices Committee (CTCDC)
100 N. Main Street, 10th Floor
Los Angeles, CA 90012

RE: Request to Experiment with Steady Red Stop Line Lights

The City of Los Angeles Department of Transportation (LADOT) is requesting the CTCDC's approval to conduct an experiment of steady red stop line lights that supplement the traffic signal indications at five intersections along the Metro Orange and Blue Lines. As shown in the attachment, a conditional approval has been granted by the Federal Highway Administration (FHWA) with the reference number of "HOTO-1 4-341 (E) Steady Red Stop Line Lights – Los Angeles".

Also attached are the original request to FHWA and the agreement letter signed by LADOT and the Los Angeles County Metropolitan Transportation Authority (Metro) to comply with the conditions set forth by the FHWA. Three control sites with comparable conditions but at which no experimental devices are installed will be monitored. The analysis and evaluation of the data will be conducted in accordance with Empirical Bayes statistical methods. Engineering plans will also be submitted to the FHWA for approval prior to installation.

LADOT will take the lead in submitting the semi-annual progress reports and a final evaluation report to CTCDC and FHWA during and after the experiment. LADOT will not turn on the devices until approval from CTCDC is obtained.

Thank you for considering the request and if you have any questions or comments, please contact Kang Hu at 213-972-8627.

Sincerely,

Sean Skehan

Sean Skehan, P.E.
Principal Transportation Engineer
LADOT

Attachments
cc: Abdul Zohbi, Metro
Kang Hu, LADOT

Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952
213.922.2000 Tel
metro.net

Metro

May 27, 2008

Mr. Scott Wainwright
Federal Highway Administration
USDOT
1200 New Jersey Avenue S.E.
Washington D.C., 20590

Re: HOTO-1- 4-341(E)-Steady Red Stop Line Lights-Los Angeles

Dear Mr. Wainwright:

The Los Angeles County Metropolitan Transportation Authority (METRO) and the Los Angeles Department of Transportation (LADOT) have received the conditional approval from you for the proposed experiment of the Steady Red Stop Line Lights.

First, we would like to thank you for entrusting us to conduct this experiment that would enhance traffic safety for the Metro Orange Line and Blue Line operations. Second, we concur with the three conditions set forth by the USDOT regarding the proposed experiment and will comply fully with the requirements.

We are looking forward to a successful start for this important safety project.

Sincerely,

Abdul Zohbi,
System safety Manager
METRO

Sean Skehan, P.E.
Principal Transportation Engineer
LADOT

U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Avenue, SE.
Washington, DC 20590

MAY 9 2008

In Reply Refer To: HOTO-1

Ms. Carolyn Flowers
Chief Operations Officer
Los Angeles Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952

Dear Ms. Flowers:

Thank you for your April 21 letter, co-signed by Mr. Sean Skehan of the city of Los Angeles Department of Transportation, requesting approval to experiment with steady red in-roadway lights along the stop lines at five intersections in the city of Los Angeles along the Metro Orange Line exclusive busway and along the Metro Blue Line light rail transit (LRT) in-street corridor. The red in-roadway lights would be activated by approaching busway or LRT vehicles and would be illuminated steady red only during the time that the vehicle traffic signals controlling the movement(s) crossing the busway or LRT line are displaying red indications.

The purpose of your experiment with the steady red in-roadway lights, which do not conform to the current requirements of the Manual on Uniform Traffic Control Devices, is to evaluate their effectiveness in reducing violations of the red signals and improving safety at intersections along these Metro corridors that continue to experience a high frequency of violations, crashes, and near-misses with transit vehicles, despite the implementation of other, more conventional countermeasures.

We have reviewed your request and we concur with it except for the following:

- In addition to before and after data at the five experimentation sites, it is necessary that comparable data be collected and analyzed at one or more "control sites" having comparable conditions but at which no experimental devices are installed.
- The analysis and evaluation of the data should be conducted in accordance with Empirical Bayes statistical methods, so as to minimize the effects of "regression to the mean."
- Details of the number, placement, and spacing of the in-roadway lights should be forwarded to this office once the engineering plans are completed.

MOVING THE
AMERICAN
ECONOMY

Although the experiment is being funded by the Metropolitan Transportation Authority (MTA), the roadways involved are under the jurisdiction of the city of Los Angeles Department of Transportation (LADOT). Thus, we are granting approval to the LADOT to conduct the requested experimentation for a period not to exceed three years from the date of this letter, subject to our receipt of agreement by MTA and by the city of Los Angeles to comply with the three items listed above. You may e-mail the agreement to Mr. Scott Wainwright of our staff at **scott.wainwright@dot.gov**. We look forward to receiving that agreement and the required semiannual reports and evaluation results from the experimentation.

We appreciate your interest and effort in improving safety and operations at signalized intersections along at-grade transit corridors. For reference purposes, we have assigned the request the following official ruling number and title: "4-341(E)–Steady Red Stop Line Lights – Los Angeles." Please refer to this number in any future correspondence. If we can be of further assistance in this project, please contact Mr. Wainwright by e-mail or by telephone at 202-366-0857.

Sincerely yours,

Robert Arnold
Director, Office of Transportation
Operations

Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952
213.922.2000 Tel
metro.net

Metro

April 21, 2008

Federal Highway Administration
1200 New Jersey Avenue, S.E.
HOTO-1
Washington, DC 20590

RE: Request to Experiment In-Roadway Warning Lights

This is a request for permission to conduct an experiment of an In-Roadway Warning Light (IRWL) system that supplements the traffic signal indications at intersections. This non-standard traffic control system, which is comprised of a series of LED lights embedded in the roadway is designed to enhance and emphasize to motorists the conditions of the traffic signal where visibility, background noise or other distractions are a factor. We hope to determine motorists' recognition of changing conditions of the traffic signal, accomplish a reduction of the stop bar incursion and increased compliance with Red traffic signal indications and prohibited turning movements. The proposed experimental project will be funded by the Los Angeles County Metropolitan Transportation Authority (Metro). The Los Angeles Department of Transportation (LADOT) will partner with Metro by providing engineering drawings and construction oversight. Metro will be responsible for collecting and evaluating project data and preparing a final project report. The sponsoring agencies are Metro and LADOT.

1. Statement of Problem

Metro Orange Line

Metro and the City of Los Angeles installed a 14-mile Busway (Metro Orange Line) that connects the North Hollywood Metro Red Line station to the Warner Center on the west side of the Valley. The first thirteen miles of the Busway is located on dedicated right-of-way (ROW) and follows the old Southern Union Pacific Railroad alignment along the Chandler Boulevard corridor. The Busway exits the dedicated ROW at Canoga Avenue and travels the last mile to the Warner Center on city streets. It passes through 44 signalized intersections, 37 of which are located along the dedicated ROW and are new. The facility opened in October 2005 and due to several accidents and numerous near misses reported along the dedicated right-of-way portion of the Busway, a Safety Task Force comprised of key members from Metro, the City and associated law enforcement agencies (LA Police and Sheriff Departments) determined that photo enforcement cameras should be installed at the twelve high-risk intersections. In addition to the photo enforcement at these twelve intersections, additional signage (static Bus X-ing and Look Both Ways, and active LED bus coming signs) and pavement markings (Keep Clear and Wait Here) were installed throughout the Busway where deemed necessary and appropriate. These additional safety features have had a positive impact on the overall safety of the Busway by substantially lowering the incidence of reported accidents and near miss incidents. However, due to the unique nature of the dedicated Busway, it

continues to have accidents and near miss incidents as well as red light violations, stop line adherence issues and creep over issues especially at the aforementioned photo enforcement intersections that we feel could be further reduced by the installation of stop line IRWL system.

Metro Blue Line

The Metro Blue Line (MBL) is a light rail line that runs between downtown Los Angeles and downtown Long Beach and serves 22 stations over a 22-mile route. The Metro Blue Line connects to the Metro Green Line at Rosa Parks/Imperial station in Compton and connects to the Metro Red Line at 7th/Metro Station in downtown Los Angeles. Currently, Metro operates two-car and three-car trains on the line depending on the time of the day. The alignment is made up of two types of corridors. One is known as the "Cab-signal" corridor where trains operate at speeds up to 55MPH and all grade crossings are equipped with flashing warning lights, gates, and bells. The other corridor is know as "Street-running" where trains travel at 35MPH or less and are governed by specially designed train signals that are coordinated with the street traffic lights. It is in "Street-running" corridors, both in Los Angeles and Long Beach, that Metro is experiencing accidents that are a result of motorists making illegal left turns in front of oncoming trains. Throughout the street-running alignments, there are dedicated left turn lanes where the left turning movement is governed by dedicated left turn arrows. Adjacent to the arrows, Metro has installed active "TRAIN" warning signs that activate when a train approaches the intersection and the red arrow is on. Despite the additional warning devices installed, Metro continues to experience accidents where motorists violate the red left turn arrows and collide with trains at the intersections. Therefore, to further increase safety and awareness at the intersections, Metro and LADOT are proposing to conduct a trial installation of the IRWL system.

2. Proposed Solution

The proposed solution is an experimental installation of the IRWL System. After years of study, human factors indicate that such a system could be an effective way of increasing awareness for motorists of prohibited movements. The IRWL System is to be used only as an enhancement to the standard traffic signal control device. Because of the strategic placement of this system the series of lights will be in direct line of sight of the motorists making it virtually impossible for the motorist not to be aware of the red signal indications.

3. Illustration of In-Roadway Warning Lights System

The warning lights will be installed across the stop lines, and on the outside of the crosswalk area. When the traffic signal phase is green or yellow, the in-roadway warning lights will not be activated. When the traffic signal phases turn to red, the in-roadway warning lights will change to solid red and remain illuminated for the entire length of the red phase that governs the prohibited movement.

4. Supporting Data

The In-Roadway Warning Lights System was first tried by the City of Anaheim at Southwest intersection during the construction of Disney's California Adventure theme park. The primary goal of the installation was to reduce/eliminate the north-south red light violations, thus improving the safety of the intersection. Studies show that the In-Roadway Warning Lights System was able to significantly reduce the incidences of vehicles running the red light from a rate of 8.94 violations per 1000 vehicles to 2.40 violations per 1000 vehicles after the system was installed. Once the theme park was completed the intersection has been reconfigured.

5. No Patent or Copyright

Both Metro and LADOT certify that the concept of the In-Roadway Warning Lights is not protected by a patent or copyright. More than one vendor can provide similar devices.

6. Experiment Schedule and Locations

a.	Design and Engineering	May through September 2008
b.	Installation	October through December 2008
c.	Experimental and Evaluation Period	January 2009 - June 2010
d.	Final Written Report	September 2010

LOCATIONS		CROSS STREET	FUNCTIONAL CLASS
a.	De Soto Avenue	Busway	Major
b.	Sepulveda Boulevard	Busway	Major
c.	Mason Avenue	Busway	Secondary
d.	Woodman Avenue	Busway	Major
e.	Washington Blvd.	Los Angeles Street	Major (Blue Line Light Rail)

7. Evaluation Plan

All of the five intersections selected for the In-Roadway Lighting installation are equipped with red light enforcement camera systems. The camera systems have been functioning at these locations for over 1 year. Past traffic counts and red light violation data is available for comparison to the future data from the red light enforcement cameras systems that will be collected during the In-Roadway lighting experiment period. This comparison will be used to determine the effectiveness of In-Roadway lighting in reducing red light violations.

8. Evaluation Procedures

- LADOT will prepare the design and engineering drawings and provide construction oversight.
- Installation documentation will be prepared by Metro.
- Motorists' recognition to changing traffic signal conditions and ability to react in a timely fashion will be analyzed by or under direction of LADOT.

- Field observations will be conducted by the LADOT to help evaluate the effectiveness of the installation.
- Metro will be responsible for collecting and evaluating project data, preparing semiannual progress reports for the duration of the experimentation and providing a copy of the final results to the Office of Transportation Operations (HOTO) within three months of the conclusion of the experiment.

9. Restore to Before Conditions

Both Metro and LADOT agree to restore the experimental site to a condition that complies with the provisions of the MUTCD within 3 months following the completion of the experiment. We will terminate the experiment at any time if we determine that the experiment directly or indirectly causes significant safety hazards. However, if the experiment demonstrates an improvement, the devices will remain in place as a request is made to update the MUTCD and an official rulemaking action occurs.

Thank you for considering the request for experimentation. If you have any questions, comments or suggestions, please contact Mr. Abdul Zohbi of Metro at 213-922-2114, or Mr. Kang Hu of LADOT at (213) 972-8627.

Sincerely,

Carolyn Flowers, Chief Operations Officer

Mike Cannell, General Manager, Rail Operations

Sean Skehan, Principal Transportation Engineer
LADOT

cc: FHWA's District Office in California
650 Capitol Mall, Suite 4-100
Sacramento, CA 95814

09-13 Experiment Request for the USAGE OF "HOV" in lieu of "CARPOOL" Signage Related to the Los Angeles EXPRESS LANES

EVALUATION OF THE USAGE OF "HOV" IN LIEU OF "CARPOOL" ON SIGNAGE RELATED TO THE LOS ANGELES EXPRESS LANES

REQUEST TO EXPERIMENT

Recommendation: Caltrans requested experiment authorization from the CTCDC for the proposed signs

Agency Requesting/Sponsoring: Caltrans/LA County Metropolitan Transportation Agency

Submitted to: California Traffic Control Devices Committee

Submitted by:

Los Angeles County Metropolitan Transportation Authority (Metro)

California Department of Transportation (Caltrans)

BACKGROUND

Metro, in coordination with Caltrans, has received a grant from the United States Department of Transportation (USDOT) to implement congestion pricing and related improvements along two corridors in the Los Angeles region. The pilot project consists of converting existing high-occupancy vehicle lanes into high-occupancy toll (HOT) lanes along portions of I-110 and I-10 (they will be referred to as Express Lanes) increasing the quality and frequency of transit services in the respective corridors and introducing variable parking pricing to downtown Los Angeles. The conversion to HOT lanes on I-110 will run between the Artesia transit station near SR-91 at the south end and Adams Blvd in the north. On I-10, the conversion to HOT lanes will span from the start of the Busway near Los Angeles Union Station in the west and extend eastward to I-605. The request for experimentation is for the use of term "EXPRESS LANES" and "HOV" in lieu of "CARPOOL" for all signage related to the Express Lanes.

DESCRIPTION OF PROPOSED EXPERIMENT

Caltrans is proposing the usage of "EXPRESS LANES" and "HOV" in lieu of "CARPOOL" on all signage related to the Los Angeles Express Lanes. Appendix A illustrates the proposed access signing plan, which includes the typical usage of "HOV" within the project area. "HOV" would also be used on the roadside signs that provide occupancy requirements.

JUSTIFICATION

As outlined in the California Manual on Uniform Traffic Control Devices (MUTCD), "CARPOOL" is the term that is currently accepted as related to a high-occupancy vehicle lane signage within California. However, there are features of the Express Lanes project that warrant a more encompassing term. Key elements of the Express Lanes pilot project are improvements in the frequency and quality of transit services to encourage potential users to change travel modes. Both I-10 and I-110 include many transit stations within the Express Lanes themselves. There will consistently be a flow of buses within the lanes. Also, within both corridors, vanpools are prevalent and additional vanpool utilization is being promoted as part of the overall pilot project. Although "CARPOOL" is the standard terminology for HOV lane signage, the term "carpool" is commonly associated with private automobiles carrying 2 or more persons. The proposed use of the term "HOV" for this pilot project is intended to be more encompassing to emphasize the pilot projects commitment to other higher-occupancy mode types including transit and

vanpools. The term "HOV" is used in the federal MUTCD, and was recommended for this project by FHWA.

Alternatives to the use of "CARPOOL" on signage that makes reference to HOV standards are not unprecedented in California. For example, the SR-91 Express Lanes in Orange County use the term "3+ LANE" on signage for the toll plaza HOV 3+ declaration lane (see photo).

Source: http://www.westcoastroads.com

The proposed experimentation for the I-10 and I-110 Express Lanes is a further adaption of the SR-91 approach to specifically meet the needs of this project. While there is currently no federal or state standard for using the term "EXPRESS LANES" for HOT lanes, it was recommended for this project by FHWA. The next update of the MUTCD is expected to incorporate this terminology as the national standard for HOT lanes.

LOCATIONS

The proposed usage of "HOV" will be included on all signs related to the Express Lanes. Currently, it is anticipated that approximately 80 overhead signs will be installed along with numerous ground mounted and barrier mounted roadside signs throughout the two corridors.

SCHEDULE

The following timeline assumes that permission to experiment will be granted by the California Traffic Control Devices Committee (CTCDC) by May 2009:

- Spring/Summer 2009 – Prepare Preliminary Design

- Fall/Winter 2009 – Prepare Final Design
- Feb-Dec 2010 – Construction of Project
- December 31, 2010 – Project opens to traffic
- 2011- Experiment Year

The primary measures of effectiveness for these changes would be the number of violations reported by the California Highway Patrol and the number of public comments received by Caltrans and LA Metro. Caltrans District 7 develops an annual report on HOV operations, and it is expected that these annual reports will provide detailed information on the performance of these facilities. In addition, Senate Bill 1422 requires LA Metro and Caltrans to report to the Legislature on the project by December 31, 2012. It is expected that both the annual HOV reports and this report to the Legislature should be satisfactory in meeting the reporting requirements for the California Traffic Control Devices Committee.

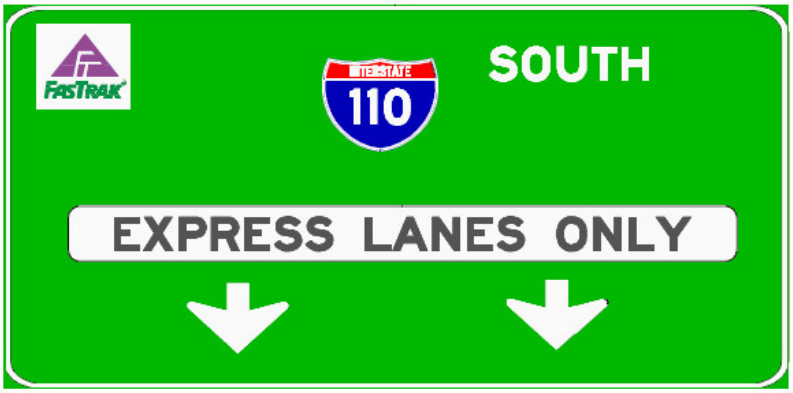
ADMINISTRATION

Sponsoring Agency:	Caltrans
Point of Contact:	Joseph Rouse, HOV Program Manager, Division of Traffic Operations
	1120 N Street, Mail Stop 36 Sacramento, CA 95814
	(916) 654-6448
Manufacturer:	Unknown at this time
Installer:	Contractor to be determined

Attachment 1 – Proposed Signage showing usage of "EXPRESS LANE" and "HOV"

Attachment 2 – Proposed Replacement Signage showing usage of "EXPRESS LANE" instead of "CARPOOL"

EXISTING SIGN PANEL



REPLACEMENT SIGN PANEL

09-14 Experiment request for the Usage of "TRANSIT LANE" in lieu of "CARPOOL" Signage

EVALUATION OF THE USAGE OF "TRANSIT LANE" IN LIEU OF "CARPOOL" ON SIGNAGE RELATED TO THE SAN DIEGO BUS RAPID TRANSIT (BRT) DEMONSTRATION PROJECT (2010 – 2011)

REQUEST TO EXPERIMENT

Recommendation: Caltrans/SANDAG requested experiment authorization from the CTCDC for the proposed signs

Agency Requesting/Sponsoring: Caltrans/SANDAG

Submitted to: California Traffic Control Devices Committee

Submitted by:

San Diego Association of Governments (SANDAG)

California Department of Transportation (Caltrans)

BACKGROUND

SANDAG, the San Diego Association of Governments, in coordination with Caltrans, has received a grant from the Federal Transit Administration (FTA) to implement a Median Shoulder Transit Lane demonstration project along the I-805 corridor in the San Diego region. The two-year pilot project consists of converting existing median (left side) freeway shoulders into Transit-only Lanes for the exclusive use of San Diego Metropolitan Transit System (MTS) buses along I-805 from the Telegraph Canyon Road interchange in Chula Vista to the Nobel Drive interchange in San Diego. This project will increase the quality and frequency of transit services on the I-805 corridor. The I-805 Transit Lane (or bus-on-shoulder) project will offer a premium level of service to transit users. The request for experimentation is for the use of the term "TRANSIT LANE" for all signage related to this project.

DESCRIPTION OF PROPOSED EXPERIMENT

Caltrans is proposing the usage of "TRANSIT LANE" on regulatory signage related to transit bus lanes on median shoulders for the exclusive use of San Diego Metropolitan Transit System (MTS) buses. Appendix A illustrates the proposed sign details that include FHWA-approved graphic of the front of a transit bus, used on a standard FHWA sign R7-107a (shown at right).

R7-107a

JUSTIFICATION

As outlined in the California Manual on Uniform Traffic Control Devices, "CARPOOL" is the term that is currently accepted as related to a high-occupancy vehicle lane signage within California. However, there are features of the bus-on-shoulder Transit Lanes project that warrant a more preferential term. Key elements of the Transit Lanes pilot project are improvements in the frequency and quality of transit services to encourage potential users to change travel modes. There will consistently be a flow of buses in the transit lanes. Although "CARPOOL" is the standard terminology for HOV lane signage, the term "Carpool" is commonly associated with private automobiles carrying 2 or more persons. An alternative to the use of "CARPOOL" on signage that makes reference to Transit buses is not unprecedented in

California. For example, the I-10 El Monte Busway in Los Angeles utilizes specific "BUSWAY" language on its signs.

Source: http://www.westcoastroads.com

The proposed experimentation for I-805 Transit Lanes is the first time this has been done on median freeway shoulders in California. Projects to allow buses to use the right shoulder have been done, and operate elsewhere on I-805. While there is currently no federal or state standard for using the term "TRANSIT LANES" this is what will be reviewed, as well as using the bus symbol instead of the diamond symbol.

LOCATIONS

The project limits are on I-805 from the Telegraph Canyon Road interchange in Chula Vista to the Nobel Drive interchange in San Diego (PM 6.4 / 25.5).

SCHEDULE

The primary measures of effectiveness for these changes would be the number of violations reported by the California Highway Patrol and the number of public comments received by Caltrans and SANDAG. Caltrans District 11 develops an annual report on HOV Operations. This Transit Lane project could be included in this report. In addition, the FTA grant requires that the project be monitored for collisions; and, a report on the effectiveness of the project be evaluated during the two-year pilot project.

ADMINISTRATION

Sponsoring Agency:	Caltrans, CTCDC Sponsor – Wayne Henley
Point of Contact:	Joseph Rouse, HOV Program Manager, Division of Traffic Operations
	1120 N Street, Mail Stop 36 Sacramento, CA 95814
	(916) 654-6448
Local Agencies:	SANDAG, San Diego Metropolitan Transit System, Caltrans District 11

Proposed Signs:

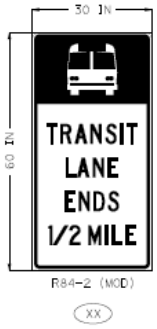
LEGEND	
LINE No.	U/C
1	5
2	5
3	5
4	5

LEGEND	
LINE No.	U/C
1	6
2	5
3	5

LEGEND	
LINE No.	U/C
1	6
2	5
3	5

LEGEND	
LINE No.	U/C
1	6
2	6
3	5
4	5
5	5

LEGEND	
LINE No.	U/C
1	5
2	5
3	5
4	5



LEGEND	
LINE No.	U/C
1	5
2	5
3	5
4	5

LEGEND	
LINE No.	U/C
1	5
2	5
3	6
4	5
5	5

7. Discussion Items:

09-15 Non-standard Traffic Control devices on Public Roadways

Agency Requesting/Sponsoring: Caltrans

The State has adopted the California Manual on Uniform Traffic Control Devices pursuant to the following standard in the CA MUTCD:

> **The U.S. Secretary of Transportation, under authority granted by the Highway Safety Act of 1966, decreed that traffic control devices on all streets and highways open to public travel in accordance with 23 U.S.C. 109(d) and 402(a) in each State shall be in substantial conformance with the Standards issued or endorsed by the FHWA.**

Section 21400 of the California Vehicle Code provides authority for Caltrans to adopt the CA MUTCD:

> **The Department of Transportation shall, after consultation with local agencies and public hearings, adopt rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to this code, including, but not limited to, stop signs, yield right-of-way signs, speed restriction signs, railroad warning approach signs, street name signs, lines and markings on the roadway, and stock crossing signs placed pursuant to Section 21364.**
>
> **The Department of Transportation shall, after notice and public hearing, determine and publicize the specifications for uniform types of warning signs, lights, and devices to be placed upon a highway by any person engaged in performing work which interferes with or endangers the safe movement of traffic upon that highway.**
>
> **Only those signs, lights, and devices as are provided for in this section shall be placed upon a highway to warn traffic of work which is being performed on the highway.**
>
> **Any control devices or markings installed upon traffic barriers on or after January 1, 1984, shall conform to the uniform standards and specifications required by this section.**

Section 21401(a) of the California Vehicle Code prohibits placement of non-compliant traffic control devices:

> **Except as provided in Section 21374, only those official traffic control devices that conform to the uniform standards and specifications promulgated by the Department of Transportation shall be placed upon a street or highway.**

If a public agency discovers an unauthorized traffic control device on one of its streets or highways, it clearly has the authority to remove the device and seek civil or criminal action against the perpetrator. But what if a public agency itself chooses to install a non-compliant traffic control device? Neither the US Code nor California law specifies the penalties for a public agency violating the prohibition against placement of non-compliant traffic control devices nor delegates to any State agency the authority to enforce the prohibition. Currently the only recourse is through another agency or a member of the public taking legal action.

Despite the prohibition against placement of non-compliant traffic control devices, even a cursory inspection of streets and highways in California reveals a large number of non-compliant traffic control devices. This lack of uniformity is undesirable for reasons given in the Introduction to the CA MUTCD.

The CTCDC may want to assign a subcommittee to address this issue and recommend appropriate action, be it legislative, regulatory or otherwise.

09-16 Signage, Intersection Design, and the 3.0 Second Minimum Yellow for Turning Movements Monitored by Red Light Cameras

James Lissner
Box 264
Manhattan Beach, California 90267
(310) 376-4626

April 8, 2009

California Traffic Control Devices Committee
c/o: Mr. Devinder Singh, Executive Secretary, by email

Venue: May 14, 2009 Meeting

Subject: Signage, Intersection Design, and the 3.0 Second Minimum Yellow for Turning Movements Monitored by Red Light Cameras

Hon. Chairman and Committee Members:

This letter discusses three problematic intersection configurations where action by the Committee would bring a great reduction in violations.

I. Problematic Left Turns

A. "Soft" (or partial) Left Turn (Example: Atlantic/Telegraph in the City of Commerce)

In the twelve months of 2008 the City of Commerce issued 3630 tickets to motorists making the partial left turn from southbound Atlantic Boulevard to Telegraph Road. The arrow in Figure 1, below, points towards the limit line for that movement.

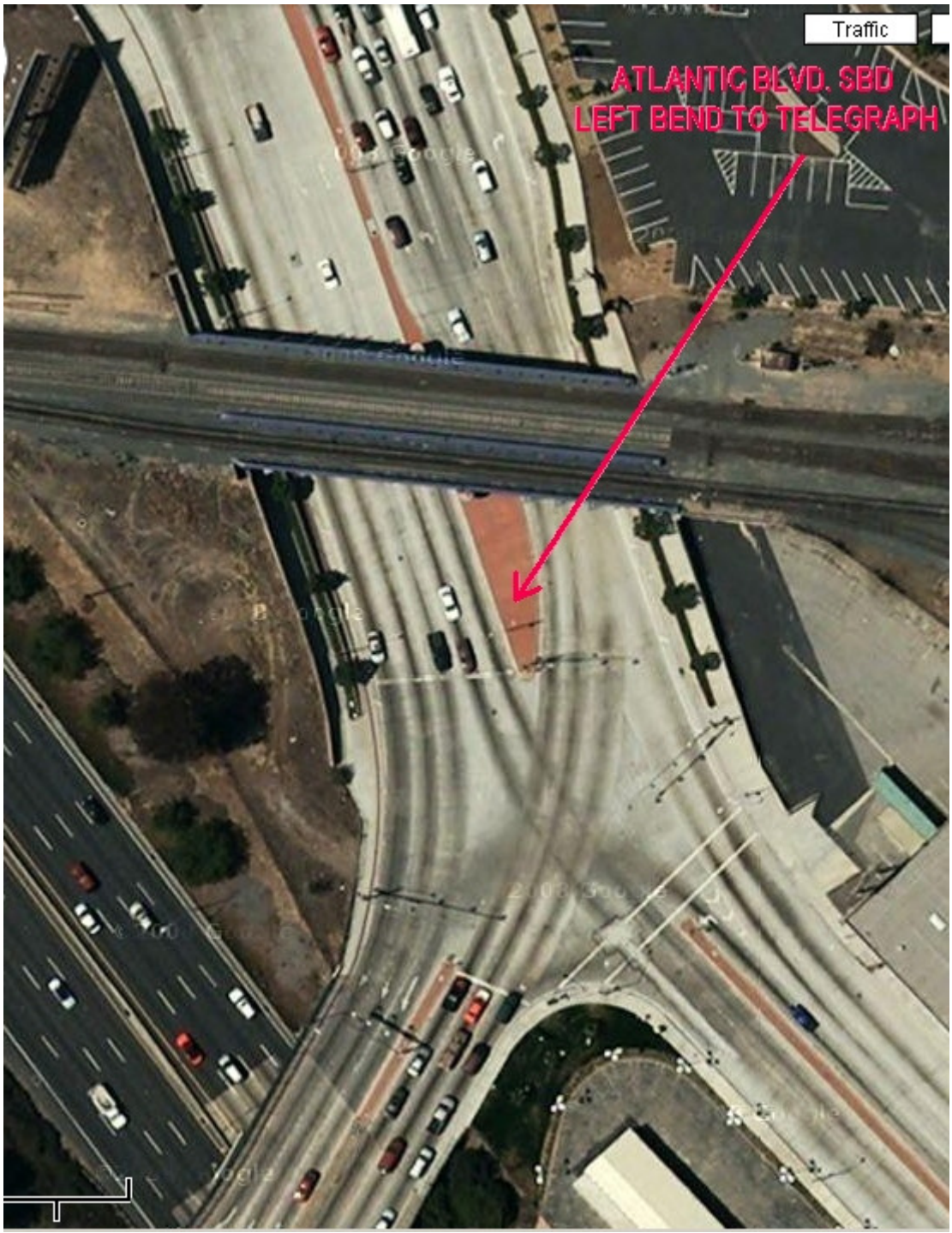


Fig. 1, Aerial view, southbound Atlantic Blvd. at Telegraph Rd., City of Commerce (arrow points to the limit line for southbound traffic)

The monthly breakdown of tickets issued is as follows:

January	366
February	380
March	456

April	337
May	273
June	224
July	184
August	266
September	227
October	290
November	223
December	404

Table 1, Tickets issued, southbound Atlantic Blvd. at Telegraph Rd., City of Commerce, 2008

As can be seen from the aerial view (Figure 1), the Atlantic/Telegraph movement is an approx. 20 degree, large-radius bend to the left involving two un-pocketed lanes. The City of Commerce evidently has treated this movement as a protected left turn and has set the length of the yellow at 3.0 seconds, in apparent reliance on the Traffic Manual, which says:

> *The minimum yellow light change interval for a protected left-turn or a protected right-turn phase shall be 3.0 seconds.* (Manual at 4D.10)

I contacted Caltrans Traffic Operations, to see if Caltrans' definition of the term "left turn" included the movement geometry described above. I initially spoke to Mr. Don Howe, who referred me to Mr. Dave Gamboa who on March 4 told me he could not find a definition for the term.

On March 9 I spoke to Commerce City Administrator Jorge Rifa, and on March 18 I wrote to him (see correspondence attached) expressing my concern that the ticket count for Atlantic/Telegraph, and for the system as a whole, was not dropping as is expected after the institution of camera enforcement. I suggested that the movement should be treated as a straight-through, not a left, and that the yellow should be increased to at least 3.6 seconds making it consistent with the 35 mph posted limit. As of today, I have received nothing to indicate that the City is considering my suggestion.

I recommend that the Committee take action to stop cities from applying the 3.0 second minimum in places where it clearly is not applicable. A 3.6 second yellow would more than halve the number of violations, compared to a 3.0 second yellow. Suggested language is below, in the discussion of the Rocklin Road left turn.

(I will provide, at no charge, a copy of the City of Commerce's official monthly red light camera ticket tabulation to any Committee member or member of the public upon their request made to me at the phone number above.)

I. Problematic Left Turns, (cont'd)

B. Skewed Turns (Example: Rocklin Road Onramp to the Westbound I-80, City of Rocklin)

In June 2008 the City of Rocklin installed a camera monitoring the left turn from westbound Rockin Road onto the westbound onramp of Interstate 80, and in the last six months of 2008, they issued 1371 tickets to motorists there.

The ticket count is rising, not falling as should happen after the installation of a camera. It is also dramatically higher than the ticket count at the other camera installation in the City. See Table 3, below.

	Rockin Road at I-80	Sunset at Park
June	93 (startup month)	72 (started in 2006)
July	250	40
August	98	49
September	145	55
October	232	64
November	329	49
December	317	55

Table 3, tickets issued, Rocklin Road onramp to westbound I-80 and Sunset at Park, City of Rocklin, 2008, from monthly police department report to city council, available on the City's website

Rocklin Road at the I-80 is a skewed intersection, with the limit line located (arrow in Figure 2 below) some distance before the actual place where the left turn is to be made. Like Atlantic/Telegraph, this left turn is located just after traffic emerges from an underpass.

Fig. 2, Aerial view, westbound Rocklin Rd. at onramp for westbound I-80, City of Rocklin (arrow points to limit line for the left turn)

The yellow for the left turn is set at 3.0 seconds, and increasing it would likely reduce the number of violations to some extent - and should be done. But the violations I have heard about involve the motorist totally misunderstanding the location of the limit line, and ultimately stopping some distance beyond it. Such violations would *not* be eliminated by a longer yellow - they reveal something wrong with the design or marking of the intersection, or the position of the signals. On February 17 I spoke to Mr. Jim Calkins and Mr. Mike Smith of Caltrans about the intersection, and asked them to consider revising the markings there. To date I have received nothing to indicate that anything is being done.

This intersection design is commonly used at onramps - but rarely enforced with a camera. I recommend that where these intersections are enforced via a red light camera, the agency doing the enforcement or operating the intersection be required to make an engineering study before the camera is installed and, once the camera is in operation, to make improvements to the intersection to ensure that the number of violations decreases over time. For left turns, I propose the following language for the California MUTCD, Section 4D.10 (Yellow Change and Red Clearance Intervals):

Standard:

The minimum yellow light change interval shall be in accordance with Table 4D-102(CA). The posted speed limit, or the prima facie speed limit established by the California Vehicle Code (CVC) shall be used for determination of the minimum yellow light change interval for the ~~through~~ traffic movement *except as follows:*

***A.* The minimum yellow light change interval for a protected left-turn or protected right-turn phase shall be 3.0 seconds.**

B. For purposes of this Section, the term "protected left-turn phase" shall be defined to not include a movement:

1. Having a turn angle of less than 70 degrees, or

2. for which one or more lanes do not have dedicated turn pockets, or

3. for which any dedicated turn pocket is longer than 200 feet, or

4. located at an intersection where any of the intersecting roadways is skewed 20 degrees or more, or

5. for which the limit line is located within 200 feet driving distance of the roadway's emergence from a tunnel, underpass, or other manmade covering.

C. For purposes of this Section, the term "protected right-turn phase" shall be defined to not include a movement:

1. Having a turn angle of less than 70 degrees, or

2. located at an intersection where any of the intersecting roadways is skewed 20 degrees or more, or

3. for which the limit line is located within 200 feet driving distance of the roadway's emergence from a tunnel, underpass, or other manmade covering.

II. Problematic Right Turns

A. No Turn on Red, Camera Enforced (Example: Telegraph at Garfield, City of Commerce)

My initial interest in the City of Commerce's red light cameras was due to the Atlantic/Telegraph movement discussed above. However, while reviewing data I obtained from the City, I noticed a lot of tickets at another intersection, Telegraph and Garfield. The cameras there were started in the middle of December 2007, and in the twelve months of 2008, the camera monitoring traffic eastbound on Telegraph generated 2395 tickets. The "eastbound" data stood out for two reasons: (1) While the ticket count had decreased after the first two full months of operation of the eastbound camera, in the last four months of 2008 the count *increased*, dramatically and (2), the ticket count from the camera monitoring *west*bound Telegraph at the same intersection was much smaller, only 416 tickets during the same period. See Table 2, below.

	Eastbound	Westbound
January	314	14
February	285	33
March	135	51
April	152	26
May	108	33
June	127	28
July	87	15
August	55	31
September	210	39
October	390	43
November	304	42
December	228	61

Table 2, Telegraph at Garfield, left turn, straight-through, right turn combined, City of Commerce, 2008

On March 18 I inquired with the Los Angeles County Sheriff's Department, which issues the tickets for the City, and was told by Sgt. Brookwell that the high number of tickets going to eastbound motorists was because many ignored the "No Turn on Red" signs.

Among the materials I requested from the City was a sampling of actual tickets issued. While those sample tickets did not give the motorist's name or address, they showed hair and eye color consistent with a predominately Hispanic population. (I cannot distribute copies of the sample tickets, but I will bring them with me to the May 14 meeting.) There are two "No Turn on Red" signs posted facing eastbound traffic at the intersection, but those signs are in English. On March 25, I contacted Caltrans to see if signs were available with an international symbol for "No Turn on Red." I again spoke with Mr. Howe, who told me that there was no international symbol. He suggested the use of a "Blank Out" sign wired to display the international symbol for "No Right Turn" at the appropriate times during the signal cycle.

I recommend that where "No Turn on Red" is enforced via a red light camera, the agency doing the enforcement be required to use one or more "blank-out" signs to display the turn prohibition in a way that is language-independent. Proposed language for the California MUTCD, Section 2B.45:

Standard:

A symbolic NO TURN ON RED (R10-11) or No Right Turn on Red (R13A(CA)) or No Left Turn on Red (R13B(CA)) signs (see Figure 2B-19 and 2B-19(CA)) shall be used to prohibit a right turn on red (or a left turn on red from a one-way street to a one-way street). ***A symbolic No Right Turn on Red (R13A(CA)) or No Left Turn on Red (R13B(CA)) blank-out sign (see Figure 2B-19 and 2B-19(CA)) shall be used to prohibit a right turn on red (or a left turn on red from a one-way street to a one-way street) where an automated enforcement system (operated pursuant to California Vehicle Code Sec. 21455.5) is used to enforce the turn restriction*****.**

Sincerely,

Jim Lissner

Attached:
Email with City Administrator Jorge Rifa
Emails sent and received March 18, 2009:

Mr. Lissner,

I am copying your message to Sergeant Brookwell and Mr. Batson.

Jorge Rifa

From: Jim [mailto:jim@vivahermosa.com]
Sent: Wednesday, March 18, 2009 4:11 PM
To: Jorge Rifa
Subject: Red light cameras in Commerce - the yellow time

Dear Mr. Rifa:
Thank you for the phone message yesterday, about the yellow timing on the red light cameras.

In your message you explained that the yellow lights in Commerce are set to state standards.

The state standards say that for a left turn the minimum yellow is 3.0 seconds. My concern is whether the slight turn of the #1 and #2 southbound lanes at Atlantic/Telegraph is functionally a left turn. If it were to be treated as a straight thru movement, the yellow would need to be at least 3.6 seconds, the length specified for straight thru movements in a 35 mph zone - and violations would be reduced by more than half.

I also want to bring up a two new concerns, raised by materials I received from the City yesterday pursuant to a request I made under the Public Records Act.

Among the materials I received was a tabulation of the number of tickets issued, broken down by month and by intersection. (Your city clerk has copies of what was sent to me.) I've just made a quick review of the tabulation, and have noticed that besides the very high number of tickets at

southbound Atlantic/Telegraph, there is a high number of violations at Telegraph and Garfield. My understanding is that high ticket count at Telegraph/Garfield is because motorists are ignoring the No (Right) Turn on Red signs there. I also noticed that despite heavy enforcement, the number of violations is not dropping. I would like to suggest that the City improve the signage and markings there, perhaps using international symbols.

My second concern is that, over the last year there has not been a drop in the number of violations for the whole system - in fact, the current trend is an increase. I am not a traffic engineer, but this suggests to me that the problem is not to be cured by the use of heavy enforcement - that it may be necessary to look at the design and markings of the intersections - and, with the exception of places where right turn violations predominate, the length of the yellow lights.

Sincerely,

Jim Lissner

Information Items

09-17 California MUTCD Revision to include National MUTCD 2003 Revision No. 2 Maintaining Traffic Sign Retroreflectivity

Background:

Caltrans is working on revisions to the current California MUTCD in response to the CTCDC request at the September 17, 2008 meeting recommending adoption of the "**MUTCD 2003 Revision No. 2 – Maintaining Traffic Sign Retroreflectivity**" into the CA MUTCD **(under Item 08-13, MUTCD 2003 Revision No. 2 – Maintaining Traffic Sign Retroreflectivity)**.

In addition to the adoption of MUTCD 2003 Revision No. 2, Caltrans plans to include the following topics in this revision:

- All traffic control device policies that have been made official since September 26, 2006 and posted on the CA MUTCD web site at the following web link as "New Policy Directives": http://www.dot.ca.gov/hq/traffops/signtech/signdel/policy.htm

- All previous CTCDC recommendations identified as "Pending Items for Caltrans Actions" on the most recent March 19, 2009 CTCDC Agenda. See page 3 of 10 at the following web link: http://www.dot.ca.gov/hq/traffops/signtech/newtech/agenda/Agenda031909.pdf

- All errors/errata and editorial changes that have been submitted for the California MUTCD since its issuance on September 26, 2006. These changes are minor and correct existing current policy. They do not constitute any change to current policy.

Since the National MUTCD Revision No. 2 is not effective immediately in California but we have a maximum of 2 years from the December 21, 2007 date to incorporate these changes into the California MUTCD, the revised California MUTCD will need to be issued before December 21, 2009. Caltrans does not anticipate the need for a workshop to discuss this revision and changes since all the changes that are planned to be included are based upon past CTCDC recommendations to Caltrans or of minor editorial/errata nature. However, if Committee believes there is a need for the workshop, Caltrans will host one in Sacramento. Caltrans plans to make the draft CA MUTCD revision available for CTCDC review a minimum of 30 days before the next CTCDC meeting. In addition, Caltrans plans to seek recommendation from the CTCDC at the next meeting to formally adopt this revised California MUTCD as the official traffic control device manual for California.

09-18 American Recovery and Reinvestment Act Project Funding Sign Assembly

Economic Stimulus Funding Sign Policy California Department of Transportation

American Recovery and Reinvestment Act Project Funding Sign Assembly

Support:

On March 3, 2009 President Obama made the commitment that all projects funded by the American Recovery and Reinvestment Act (ARRA) will bear a "RECOVERY.GOV" pictograph to make it easier for Americans to access information on-line and monitor projects funded by the ARRA. To meet this commitment, the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) strongly encourage agencies in California to use the economic recovery signs on all projects funded by the ARRA.

Standard:

In no case shall these signs be placed such that they obscure road users' view of other traffic control devices.

Guidance:

The following factors should be considered with respect to design and placement of these signs:

Sign Design

All economic recovery sign design layout and color should be similar to the sign assembly design attached with this guidance. Sign specifications are available on-line at:

http://www.fhwa.dot.gov/economicrecovery/arrasigndetail.pdf

Sign Placement

With respect to placement of traffic control signs, regulatory, warning, and guide signs should have a higher priority than the economic recovery signs.

Economic recovery signs should be placed where they can be easily identified with the corresponding projects.

If the placement of economic recovery signs conflicts with newly installed higher priority signs, or traffic signals, or temporary traffic control devices, or other priority devices, the economic recovery sign should be relocated.

On projects where other funding identification signs are used, the economic recovery sign should be placed downstream of the Proposition 1B Funding, or Caltrans construction project funding identification sign.

Due to public safety concerns, economic recovery signs should not be allowed at the following locations:

- On the front, back, adjacent to or around any traffic control device, including traffic signs, signals, changeable message signs, traffic control device posts or structures, or bridge piers.
- At key decision points where a driver's attention is more appropriately focused on traffic control devices, roadway geometry, or traffic conditions. These locations include, but are not limited to exit and entrance ramps, intersections controlled by traffic signals or by stop or yield signs, highway-rail grade crossings, and areas of limited sight distance.

Policy last updated
March 17, 2009

For questions, e-mail jennifer_perry@dot.ca.gov
or e-mail/call Don_Howe@dot.ca.gov (916)654-2634

PROJECT FUNDING SOURCE SIGN ASSEMBLY
AMERICAN RECOVERY AND REINVESTMENT ACT
SIGN LAYOUT DETAILS

PROJECT FUNDING SOURCE
SIGN ASSEMBLY

Discussion Item Added (Amended Agenda Item):

09-10 Section 2B.13 Speed Limit Sign (R2-1) of CA MUTCD

The Department recommends using the existing regulations in the CA MUTCD with added emphasis on the required documentation for applying the additional 5 mph reduction currently allowed. Additional 5 mph reduction must be justified by a registered engineer in the Engineering and Traffic Survey with concurrence from the law enforcement agency responsible for the designated roadway.

The final document will be shared with the CTCDC members, if they have any comments/ suggestions, they will be reviewed for further actions, if needed.

(If you have any questions or need clarification, please contact Roberta McLaughlin at (916) 651-1248 or via email: Roberta.Mclaughlin@dot.ca.gov)